

# MEDICAL STATUS OF MARSHALLESE ACCIDENTALLY EXPOSED TO 1954 BRAVO FALLOUT RADIATION: JANUARY 1985 THROUGH DECEMBER 1987

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and William A. Scott

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## DEDICATION

This report is dedicated to the captain and crew of the M.V. Liktanur. For ten years the Liktanurs II and III have served as home and workplace for much of each medical mission to the Marshall Islands. Throughout this time it has been the good fortune of the medical program to have the excellent support of the ship's crew. More importantly, that good fortune was extended to the population served by the medical team; the emergency rigging of oxygen tanks to treat hypoxic patients, lighting of a small airstrip at night to facilitate an emergency air evacuation, radio liaison, transport of patients between the atolls and to and from shore, and the emergency repair of medical equipment are just some of the nonnautical activities that benefited the medical missions. Now, a new support vessel for work in the Marshall Islands has come under contract to the Department of Energy. Therefore, on the departure of the Liktanur, we would like to acknowledge our debt to Capt. Keith Coberly; Monroe Wightman, engineer; Jim Whitney and Jan Kocian, first mates; Cisco Peru, cook; Les Nunes, boatswain; Tony Ned and Mathan Almen, seamen; and other crew members who, for shorter periods, also contributed to the effectiveness of the missions. We thank them for a job well done.

## IN MEMORIAM

Two former members of the Brookhaven medical team who participated in several surveys died during the past year. Colonel Austin Lowrey, Jr., died at the age of eighty-six. He was a well-known ophthalmologist with a long career in the army. He was a most kind and generous person and contributed a great deal to the evaluation of possible radiation effects on eyes. Dr. Leo Meyer, who died at age eighty-two, was a well-known hematologist and was Director of the Sickle Cell Anemia Program of the Veterans' Administration. He made outstanding contributions to the program in evaluating hematological radiation effects. Leo will be remembered for his joviality, for always having a joke ready to cheer us. Both of these men were well liked by medical teams and the Marshallese people, and we shall truly miss them.

Robert A. Conard, M.D.  
January 23, 1989

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## INTRODUCTION

This report updates, through 1987, the medical findings on a population of Marshallese accidentally exposed to radioactive fallout in 1954. The Marshall Islands Medical Program of the Medical Department, Brookhaven National Laboratory, issues these summaries for distribution to institutions and individuals worldwide who are concerned about the adverse medical consequences of radiation exposure in general or, in particular, the plight of the radiation-exposed Marshallese.

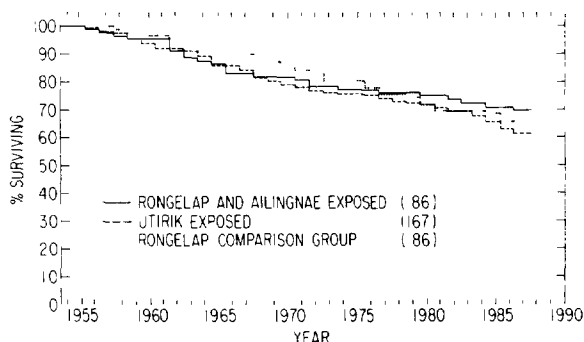
The exposed Marshallese population originally comprised 64 persons on Rongelap Atoll who received an estimated 190 rads of whole-body external gamma radiation, 18 on Ailingnae Atoll who received 110 rads, and 159 on Utirik Atoll who received 11 rads. In addition, there were 3 fetuses on Rongelap, 1 on Ailingnae, and 8 on Utirik, each of which received equivalent whole-body doses. Because of radioiodines in the fallout, the thyroid gland received an additional exposure that was much greater than the whole-body dose, although its magnitude was, in part, a function of age at the time of exposure (Lessard et al., 1985).

The content of this report is restricted to the more recent medical findings, some aspects of which bear on late effects of radiation exposure. Those features of the Marshall Islands Medical Program by which medical diagnosis and treatment are provided are discussed. For detailed information on the nature of the 1954 fallout and the acute effects suffered by the population, the reader is referred to several earlier publications (Bond, et al., 1955; Cronkite et al., 1955; Cronkite et al., 1956; Conard et al., 1957). Other reports provide reviews of delayed effects of the exposure (Conard et al., 1980; Conard, 1984; Robbins and Adams, 1989).

## EXPOSURE GROUPS

The medical program examines and treats about 800 persons annually. However, the populations on which this report is based include only the exposed persons and a selected group of unexposed individuals. In December 1987, the number of exposed persons was: Rongelap - 50, Ailingnae - 12, and Utirik - 112. For most purposes in this report the Rongelap and

Ailingnae groups are combined and referred to as the Rongelap group, for those persons exposed on Ailingnae atoll were visiting from nearby Rongelap at the time of the fallout. Also examined was the Comparison group that dates from 1957 when 86 unexposed people from Rongelap were selected so that the Comparison group approximated, in age and sex distribution, the exposed Rongelap group (Conard et al., 1958). Sixty persons remain in this group, against which the overall survival of the exposed population is compared (Figure 1). However, a larger unexposed group is also followed. Currently numbering 135, the age and sex distributions of its members were statistically similar to those of the Rongelap and Utirik groups in 1982 (Adams et al., 1983). Included among the 135 are most of the remaining 60 individuals selected in 1957. It is this expanded unexposed population that is used for statistical comparisons of year-to-year medical events; this provides the baseline prevalences from which any unexpected consequences of the radiation exposure can be identified.



**Fig. 1:** Percent survivors of the different exposure groups since 1964. The number of persons in each group are given in the parentheses.

## THE MARSHALL ISLANDS MEDICAL PROGRAM

### Policies:

The Marshall Islands Medical Program provides medical care twice yearly to the exposed population by visiting the islands where most now reside, namely Rongelap (and, temporarily, Mejato), Utirik, Ebeye, and Majuro. In addition, the medical team provides health care to a con-

siderable number of unexposed persons. All the inhabitants of Rongelap, Mejato, and Utirik are eligible for medical attention at the time of the team visits to those islands. Team physicians need not be aware of the status of radiation exposure of the individual patient because health care delivery is the same for everyone. The only difference allotted to the exposed population is a U.S. Department of Energy-sponsored referral system to the Marshallese health care system or to tertiary care facilities in the United States for diseases that can reasonably be considered to be radiation-related or for diagnosis of such diseases. Unexposed persons are directed into the referral channels of the Health Services of the Republic of the Marshall Islands whereby referrals are assigned on the basis of priorities set by a medical committee in Majuro.

Any exposed person who has, or who might have, a malignant neoplasm, is referred to secondary or tertiary medical facilities for a definitive evaluation and for therapy if a lesion is found. The usual hospitals to which patients are referred are in Honolulu and Cleveland, the latter because of the presence there of a preeminent thyroid surgeon who has long been involved with the exposed and Comparison groups of Marshallese.

The medical program also dispenses primary medical care and preventive medical services, such as immunizations, during visits to the exposed population. In bringing modern facilities for diagnosis and treatment of disease to the exposed Marshallese, the physicians of the medical program come into contact with children and other family members of the exposed, as well as other inhabitants of the islands. It has been the policy of the Department of Energy to support the medical program in its efforts to provide primary medical care to these individuals on the basis of humanitarian need and as resources permit.

The medical direction of the Marshall Islands Medical Program and the organization of the medical missions to the Marshall Islands are centered at Brookhaven National Laboratory. The staff of the program includes a physician-director, an administrator, and a technical specialist at the Laboratory, and a Marshallese laboratory technician on Ebeye. At the time of the missions a variety of physicians are chosen for the medical team. They are skilled volun-

teers, primarily faculty from medical schools, often with past experience with the program. Logistical support is provided by the Department of Energy, capably facilitated by Holmes and Narver, Inc., Honolulu, HI. The Marshall Islands government, as requested, temporarily assigns nurses, translators, and other health care workers to each mission.

Although there are two medical missions each year, in the interim the exposed population has access to the Marshallese health care system. To expedite exchange of medical information, copies of all examination and laboratory data from the Marshall Islands Medical Program are forwarded to the Marshall Islands Health Service hospitals on Ebeye and Majuro and to the special programs set up for persons from the radiation-affected atolls, currently the 177 Health Care Plan with administrative offices at the Majuro hospital. In addition, copies of the examinations and laboratory data are given to the examinees.

A computer program with data base was developed for portable (lap-top) computers. Computerization of the clinical data permits rapid access while in the field to all findings obtained during the preceding five years of examinations and to selected data collected over more than thirty years. It is hoped that in the near future the development of compatible programs by the Marshallese 177 Health Care Plan will permit sharing of up-to-date problem lists and other medical record items that are important to effective continuity of care.

The Marshall Islands Medical Program, as a satellite clinic of the Clinical Research Center, Brookhaven National Laboratory, is accredited by the Joint Commission on Accreditation of Healthcare Organizations, a nationwide organization that sets standards of performance for institutions dispensing medical care and monitors compliance with those standards. By voluntary participation in the accreditation process, the Marshall Islands Medical Program receives a valuable and impartial external review of its policies and procedures, as well as an assessment of the adequacy of the services it provides. Laboratory and radiological services, medical records, patient satisfaction, pharmaceutical services, and clinical competence of physicians are among the many items reviewed by the Joint Commission.

Much medical data unrelated to radiation exposure is acquired during each medical mission. Some of this information, from exposed and unexposed individuals, is relevant to health care throughout the Marshall Islands. Consequently, public health reports, based on medical team observations unrelated to radiation, have been submitted periodically to the Health Services of the Republic of the Marshall Islands. The topics during this reporting period have included the following:

- 1) Serum lipids in Marshallese
- 2) Pediatric growth and development (an analysis prompted by observations of medical team physicians that Rongelap children, following their transfer to Mejado, were not maintaining their positions on charted growth curves)
- 3) Pediatric audiometry
- 4) Dental conditions on Rongelap and Utirik
- 5) Chlamydia infections in Marshallese women
- 6) Large optic disks (a relatively frequent finding by medical team ophthalmologists)

Some significant observations in these and earlier public health reports were published in medical journals. Moderately elevated serum uric acid levels were noted in many Marshallese and the frequency of this finding and that of gout were analyzed (Adams et al., 1984). Toxoplasmosis was identified as a serious health hazard in the Marshall Islands, with an estimated 200 persons being visually impaired and an incidence of chorioretinitis of 273 cases/year/100,000 seropositive persons (Adams et al., 1987). Hepatitis B, the subject of a serological survey described in a previous Brookhaven National Laboratory report (Adams et al., 1985), constituted another serious public health problem (Adams et al., 1986). The prevalence of anemia in children was described, and normal ranges for hemoglobin level and erythrocyte mean corpuscular volume for Marshallese children were derived (Dungy et al., 1987). The latter were found to be identical to those of children in the United States. Because of the devastating effects of diabetes mellitus among the Marshallese, an effort was made to determine if a dietary deficiency of chromium, a trace element that is relevant to glucose tolerance, contributed to the problem. The analytic proce-

dures used was too insensitive to quantitate blood levels of chromium, but during the analysis it was found that bromine levels were higher than those reported for any other population (Wielopolski et al., 1986). The reason for this is unknown; further, the levels of bromine that were detected fall far short of its known toxic levels. The observation by team ophthalmologists of large optic disks in many persons prompted another report to the Marshallese Health Services because the associated increase in disk cupping could be misconstrued by physicians as representing glaucoma. The high prevalence of the condition indicates Marshallese are unique among all populations in whom such measurements have been obtained (Maisel et al., 1989).

#### **Procedures:**

The exposed population, which now numbers 163, must be considered at increased risk for malignant disease as a late complication of radiation injury. Therefore, the medical program has in place a cancer-oriented annual health evaluation. The examination follows the guidelines of the American Cancer Society and includes a medical history, complete physical examination, advice on decreasing risk factors for cancer, advice on self-detection of lesions, annual pelvic examinations and Papanicolaou smears, stool testing for blood, blood count, and urinalysis. Several new diagnostic procedures were incorporated into the medical missions in the past three years. Because of the development of x-ray films and cassettes that significantly decrease radiation exposure, annual mammography is offered to all exposed women and to all unexposed women forty years of age or older. For persons over the age of fifty years, flexible sigmoidoscopy is offered every three years or whenever clinically indicated. An ultrasound machine has been acquired that greatly increases the diagnostic capabilities of the medical team, especially in managing acute problems seen at the time of team visits. For thyroid diagnosis, needle biopsy of selected thyroid nodules has been instituted in an effort to avoid surgery and the subsequent loss of normal thyroid tissue in patients with benign nodular lesions. Because of earlier medical program observations it is known that the exposed are at greater risk for certain endocrine problems and for this reason they receive annual thyroid-



function blood tests and thyroid examinations by a specialist in endocrinology or thyroid surgery. Other tests are performed on a regular basis in an attempt at early detection of malignant nonthyroidal lesions. There is also ongoing monitoring for clinical evidence of immune competence, for exposed persons may be at increased risk for unusual manifestations of infectious diseases.

Medical examinations and services performed during this three-year reporting period were conducted primarily aboard the Likatanur II and the Likatanur III, vessels chartered from U.S. Oceanography. Exceptions, as in the past, included the use of Brookhaven National Laboratory facilities on Ebeye and, when necessary, Marshallese medical dispensaries on Rongelap, Utirik, and Mejato. Laboratory support during the medical missions is provided by several technicians. Routine blood counts are performed on a J.T. Baker 5000 electronic particle counter and sizer. Leukocyte differentials and phase contrast platelet counts are part of each hemogram. A variety of nonhematological testing services is provided, including bacteriology, stool examination, and urine testing. In the past a battery of manual clinical chemistry tests was carried out using commercial spectrophotometric kits. Recently, however, Eastman-Kodak's DT-60 and DTSC analyzers were added to increase the variety of chemistry tests available in the field and to improve the turn-around time for results; this has significantly improved laboratory operation. Fortunately, there have been few problems associated with transport, operation, and handling of the new equipment on board ship, even during bad weather. A Beckman Electrolyte 2 analyzer is used to measure sodium and potassium in serum and urine. Roentgenographic services are performed with a Bennett standard x-ray unit and mammography unit, both of which are contained in a separate module on the deck of the ship. Serum is usually collected from most examinees and frozen for subsequent testing. Referral laboratories have included Bio-Science Laboratories and Accupath in Honolulu for special chemistries and serologies; Pathologists' Laboratories, Inc., Honolulu, for Papanicolaou smears and other cytology; Brookhaven National Laboratory's clinical laboratory for general chemistry and alpha fetoprotein analysis; Hazelton Biotech-

nologies Co., Vienna, VA, for hormone assays; Michael Reese Hospital and Medical Center (Dr. A. B. Schneider, Department of Endocrinology and Metabolism), Chicago, for thyroglobulin analysis; Medical Microbiology Division, University of California, Irvine, for chlamydia culture and serology; and the Eugene L. Saenger Radioisotope Laboratory, University of Cincinnati, for antimicrobial and antithyroglobulin antibody testing (Dr. Harry Maxon).

The Marshall Islands Medical Program is deeply indebted to the many outstanding physicians who, despite the inevitable personal inconvenience, participated in the medical team visits of 1985-1987. It is fair to say that they are the heart of the program. Drawn from excellent medical centers throughout the United States and from private practices, these physicians provide the program with a wide range of up-to-date clinical experience and perspective that contribute to better patient care. The physicians involved in the 1985-1987 missions are listed in Appendix A, and represent the following medical specialties:

- Internal Medicine
- Pediatrics
- Infectious Disease
- Cardiology
- Obstetrics/Gynecology
- Ophthalmology
- Endocrinology
- Surgery
- Gastroenterology
- Family Practice
- Geriatrics
- Allergy/Immunology
- Dermatology
- Neurology
- Pediatric Dentistry

The participation of many excellent medical specialists undoubtedly has been a major factor in the acceptance of the Marshall Islands Medical Program by the population it serves. The percent of persons in the exposed and Comparison groups who appear for the voluntary examinations remains high. For the current reporting period the annual acceptance rates were:

|                   | 1985 | 1986 | 1987 |
|-------------------|------|------|------|
| <b>Rongelap</b>   | 82%  | 93%  | 95%  |
| <b>Utirik</b>     | 92%  | 92%  | 90%  |
| <b>Comparison</b> | 76%  | 66%  | 72%  |

The percent of the eligible population examined on at least one occasion during the three year period was:

|                   |      |
|-------------------|------|
| <b>Rongelap</b>   | 97%  |
| <b>Utirik</b>     | 100% |
| <b>Comparison</b> | 94%  |

These figures do not include several persons residing outside the Marshall Islands. Most exposed persons in this category have medical examinations arranged through a local physician by the Department of Energy or the Marshall Islands Medical Program. The acceptance rate for mammography among eligible women was 100%. For sigmoidoscopy, about 50% of age-eligible persons elect to undergo this procedure on a regular basis.

## MEDICAL FINDINGS

### Overall Survival:

After thirty-three years there continues to be no significant difference in the survival curves of the high-exposure Rongelap group, the low-exposure Utirik group, and the unexposed Rongelap population followed for the purpose of comparison (Fig. 1). Estimates of the survival distribution by the actuarial life table method were analyzed by Mantel-Cox and Breslow statistics for testing the equality of the survival curves. The "p" values were 0.68 by both techniques. In the Brookhaven National Laboratory report covering January 1983 through December 1984, it was noted that Okajima et al. (1985) suggested that medical programs providing health screening might lead to an underestimation of the effect of radiation on mortality. In particular, it was postulated that this could explain the lower age-specific death rates from all causes among Nagasaki A-bomb survivors, compared to a control population. The effect of medical examinations on the survival of the exposed Marshallese is unknown. On the one hand about 15 percent of the Comparison group selected in 1957 is no longer seen because those individuals have voluntarily foregone examination. In addition, BNL referrals for the Comparison group are channeled into the Marshallese Health Services system, whereas selected medical problems in the exposed groups can be referred directly to tertiary care facilities in the United States. On the other hand, the exposed populations of Rongelap and Utirik have received

equivalent medical attention from the BNL program since 1972, and yet, despite the far higher radiation dose received by the Rongelap group, the survival curves are similar.

Another factor that contributes to the difficulty in interpreting differences in the group survivals in Fig. 1 is that the population used to construct the "Rongelap unexposed" curve was selected in 1957, and it is in that year that their survival is graphed as one-hundred percent; i.e., data from three years of observation, during which some deaths occurred, had already been acquired from the two exposed populations.

### Causes of Recent Mortality:

The number of deaths occurring in the last three years are as follows: Rongelap exposed - 2; Utirik exposed - 9; Comparison group - 10. The specific clinical situations are described below.

### Rongelap

**Subject No. 1.** The causes of death listed on the death certificate of this 81-year-old woman in June 1985 were "Inanition" and "Senility." When seen in March 1985, she had a normal blood pressure and cardiac examination revealed "premature beats." In 1984 she was noted to have cataracts, atrial fibrillation, and complaints of urinary incontinence, some cough, constipation, and joint pains. Her hemoglobin was 12.7 g/dl, the mean corpuscular volume was 92 fl, and the white blood cell count was 6,600 per ul with a normal differential.

**Subject No. 11.** This 81-year-old man died in 1987 of unknown cause. Diagnoses made during the preceding four years included severe osteoarthritis, chronic obstructive pulmonary disease with bullous emphysema, macrocytic anemia that was being treated with vitamin B12 injections, cataracts, and "organic brain syndrome." He had declined a medical examination when visited at his home in September 1986, but did not appear acutely ill at that time.

### Utirik

**Subject No. 2123.** This 47-year-old man died in December 1986 from biopsy-proven hepatocellular carcinoma. His alpha fetoprotein level was elevated and the serum contained hepatitis B surface antigen but no delta antibody. No evidence of tumor was found at his March 1986 examination. Symptoms related to the tumor developed in June of that year.

**Subject No. 2125.** This patient died in 1987 from carcinoma of the lung with brain metastases at age 70. He had been referred to a Honolulu hospital for evaluation of guaiac-positive stools in October 1986. A chest x-ray was negative at the time of referral. No serious problems were detected during his Honolulu examination, but respiratory symptoms from the tumor developed in January 1987. He had been a cigarette smoker, and was felt to have severe chronic obstructive pulmonary disease with recurrent bronchitis.

**Subject No. 2128.** This 39-year-old woman had diabetes mellitus complicated by chronic renal failure, severe diabetic retinopathy and neuropathy, and anemia (hemoglobin 9.4 g/dl in October, 1984). She died in a Honolulu hospital after emergency air evacuation from Utirik. Diagnoses made at the hospital included hypoglycemic and hypoxemic brain damage, diabetes mellitus treated with insulin, anemia secondary to renal failure, and sepsis.

**Subject No. 2164.** "Postpartum hemorrhage" and "uterine inertia" were listed on the death certificate of this 42-year-old woman in February 1985. Previous problems included obesity and possible gout. A blood count in March 1984 was normal.

**Subject No. 2189.** This 59-year-old woman died in 1987 from chronic renal failure due to diabetes mellitus. Her serum creatinine in March 1986 was 10.9 mg/dl and the hemoglobin level was 7.7 g/dl.

**Subject No. 2200.** "Inanition" and "senility" were the death certificate diagnoses for this 72-year-old woman who died in December 1985. A thyroid nodule had been noted at least since 1977 but the patient "appeared to be a poor surgical risk." Her hemoglobin level was 11.6 g/dl and the white blood cell count was 6,200 per ul. A left breast mass had been noted since 1966, but the patient had declined biopsy and surgery. She said the mass had been present since youth.

**Subject No. 2212.** This 66-year-old woman died in 1987 from chronic renal failure due to diabetes mellitus. She was evaluated at Kwajalein hospital in 1985 and noted to have renal failure, hypertension, and anemia. When evaluated by physicians of the 4-Atoll Healthcare

Program she was not felt to be a candidate for dialysis, and her family agreed to supportive management.

**Subject No. 2218.** The death certificate diagnosis on this 34-year-old woman in September 1985 was "congestive heart failure." When examined in March 1985, the only significant abnormality had been a urinary tract infection for which she was given an antibiotic, although asthma had been noted in the past. The patient was late in pregnancy at the time of her demise and was, on the basis of history obtained from the 4-Atoll program physicians, probably eclamptic.

**Subject No. 2249.** This woman died at age 57 in February 1986 from complications directly arising from local extension of a "malignant meningioma." A description of this patient and the tumor was presented in a previous BNL report (Adams et al., 1983) following the original diagnosis in 1982.

#### **Comparison group**

**Subject No. 814.** The death certificate diagnosis in June 1985 for this 33-year-old man was pneumococcal meningitis confirmed by culture. He worked on Kwajalein and died in Kwajalein hospital after being transferred from Ebeye hospital. His most recent BNL medical examination had been in April 1983, when problems of smoking and heavy alcohol consumption were noted. His blood count was normal at that time.

**Subject No. 821.** This 38-year-old woman died in 1986 from complication of childbirth, her death certificate diagnosis being "postpartum hemorrhage." When seen in April 1986 she was 22 weeks into her thirteenth pregnancy. No significant abnormalities were noted at that time.

**Subject No. 842.** The death certificate diagnosis on this 61-year-old man in March 1986 was "liver failure due to hepatoma." The only active problem noted in his last BNL medical examination in March 1985 was chronic low back pain. A routine sigmoidoscopic examination was normal except for the presence of hemorrhoids. Hepatitis B surface antigen was not detected in his serum, but antibody to the surface antigen was present.

**Subject No. 846.** This 63-year-old woman underwent a bone marrow aspiration in March

1986 for evaluation of anemia and leukopenia. The diagnosis of refractory anemia with excess blasts was made and subsequently confirmed in Honolulu at the Straub Clinic ("myelodysplastic syndrome with an evolving acute nonlymphocytic leukemia"). She died in 1986.

**Subject No. 928.** The cause of death in 1987 of this 73-year-old woman is unknown. When last seen by the BNL medical team in Majuro in March 1986, no serious medical illnesses were noted. She had been moderately anemic for several years (hemoglobin level between 10.5 and 11.5 g/dl), and a flexible sigmoidoscopic examination in 1985 was normal. No gastrointestinal blood loss was documented in recent years.

**Subject No. 950.** This 40-year-old woman died in Kwajalein hospital in August 1985. The death certificate diagnoses were essential hypertension and intracerebral hemorrhage. She had been known to be hypertensive for 13 years and was followed in the hypertension program of the Trust Territories.

**Subject No. 969.** The clinical diagnosis in this 69-year-old man was either metastatic tumor to the lung or pulmonary tuberculosis. However, the 1987 death certificate diagnoses were "congestive heart failure" and "pneumonia." Sputum cultures for *M. tuberculosis* were negative and there was no clinical response to antituberculous therapy.

**Subject No. 975.** When splenomegaly and thrombocytopenia were detected in March 1984, this 65-year-old man was referred for further evaluation. A lymph node biopsy in October 1984 showed "atypical lymphoepithelioid cell proliferation of uncertain etiology," possibly a lymphoma. He died in 1985 and details of the terminal illness could not be obtained.

**Subject No. 991.** This 78-year-old woman died in January 1986. Death certificate diagnoses included "septicemia, diabetes mellitus, and chronic renal failure from diabetic nephropathy." She had a mid-calf amputation of the right leg some six years earlier and was being followed at the Ebeye hospital. Her most recent BNL medical examination was in 1981.

**Subject No. 1050.** Colon carcinoma with hepatic metastases is the death certificate diagnosis in March 1985 for this 50-year-old woman.

This diagnosis was made after she was referred to Majuro for evaluation of a possible abdominal mass detected in June of 1984.

#### **Laboratory Findings:**

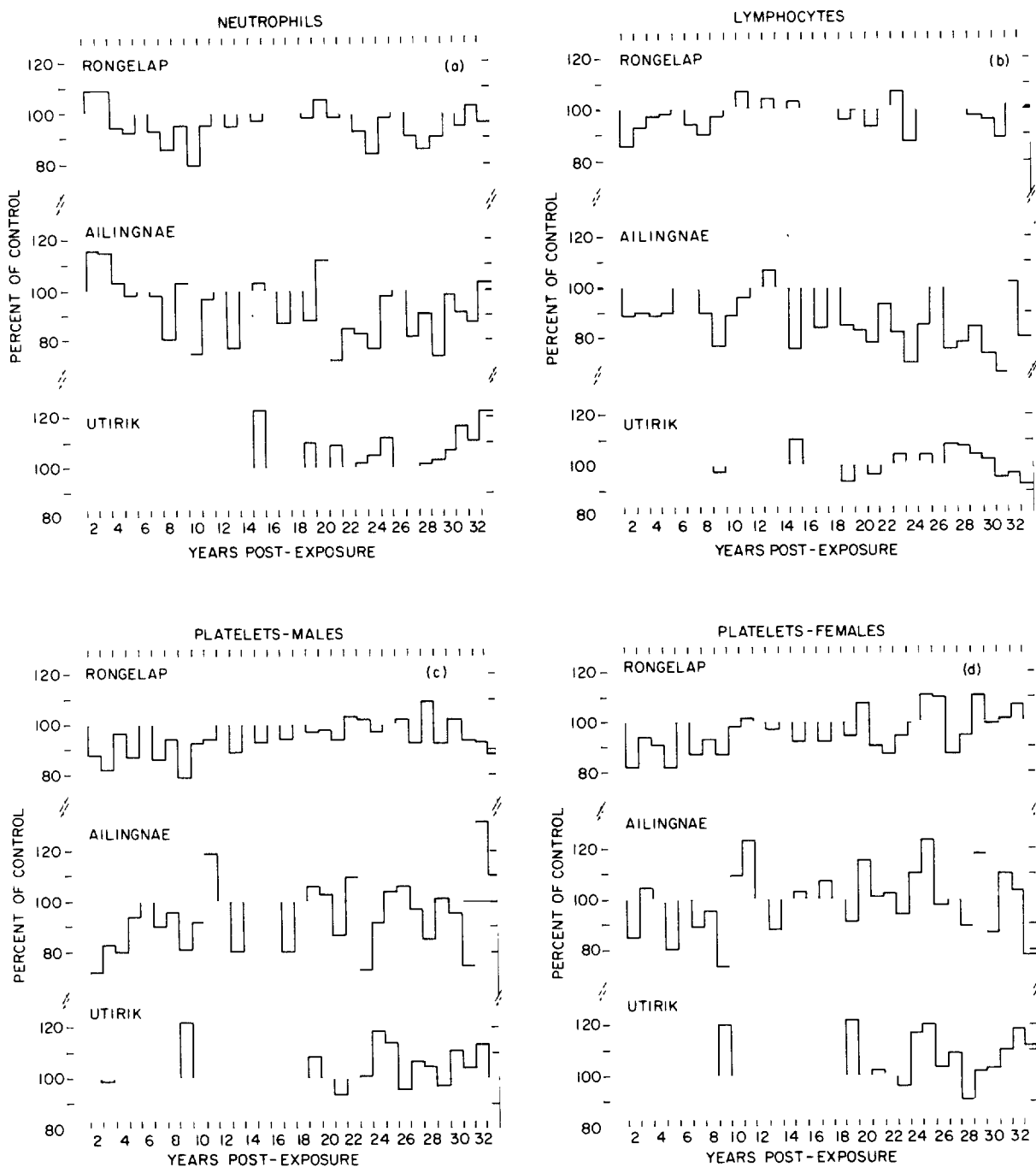
A review of average blood cell counts of the different exposure groups during the three-year reporting period does not reveal any systematic differences among groups. Figure 2 is a continuation graph in which the exposed groups are portrayed in relation to the Comparison group. Table 1 gives the actual mean counts of formed blood elements of the different groups and identifies counts which differed significantly from those of the Comparison group.

Biochemical test results are listed by individual identification number in Appendix B.

#### **Neoplasms:**

##### **Thyroid nodules**

Surgery for palpable thyroid nodules was performed on five persons in 1985 and one person in 1986. No new lesions were detected in 1987. The specific diagnoses, determined by an expert panel of pathologists, are listed in Table 2, and Table 3 gives a summary of all nodules diagnosed throughout the medical program. The benign thyroid nodules include adenomas, adenomatous nodules, and occult papillary carcinomas. The adenomatous nodules are included in the tabulation even though it is highly debatable that they are true neoplasms. The occult papillary carcinomas are, with rare exceptions, "harmless tumors" (Sampson, 1976). A recently reported autopsy series from the Federal Republic of Germany found occult papillary carcinomas in 6.2% of 1020 thyroid glands. Almost half of the tumors were multicentric and 14% had regional lymph node metastases (Lang et al., 1988). Since there was no predilection for age it was concluded, as in earlier studies, that occult papillary carcinomas have no propensity to cause clinically apparent thyroid disease. However, controversy continues on how the clinical diagnosis of occult papillary carcinoma is to be made (Schneider et al., 1980), and some authorities would accept that diagnosis only if the tumor were an incidental finding at surgery. Since some of the purported occult papillary carcinomas removed from the Marshallese patients presumably were palpable before surgery, there may be differing opinions on their clinical, if not histologic, classification.



**Fig. 2:** Annual mean blood cell counts of the different exposure groups (age 5 years or more) expressed as percent of control, beginning two years after exposure. Values for both sexes are grouped for neutrophils and lymphocytes. Detailed annual observations, including blood cell counts, on the Utirik population did not begin until 1973. Leukocyte differentials and platelet counts were not obtained for six and five of the examinations, respectively, but for graphing purposes the 100% line has not been broken at those years.

**TABLE 1:**

|                          | Comparison             | Rongelap Exposed       | Utirik Exposed           |
|--------------------------|------------------------|------------------------|--------------------------|
| <b>LEUKOCYTES</b>        |                        |                        |                          |
| 1985                     | 7392 $\pm$ 1955 (n=96) | 6731 $\pm$ 1775 (n=48) | 7985 $\pm$ 1957* (n=100) |
| 1986                     | 7438 $\pm$ 2102 (n=78) | 7231 $\pm$ 2060 (n=54) | 7684 $\pm$ 2023 (n=98)   |
| 1987                     | 7690 $\pm$ 1843 (n=78) | 7418 $\pm$ 1675 (n=49) | 8434 $\pm$ 3195 (n=90)   |
| <b>NEUTROPHILS</b>       |                        |                        |                          |
| 1985                     | 3948 $\pm$ 1433        | 3716 $\pm$ 1524        | 4606 $\pm$ 3948*         |
| 1986                     | 3786 $\pm$ 1396        | 3771 $\pm$ 1648        | 4188 $\pm$ 1570          |
| 1987                     | 3998 $\pm$ 1427        | 3825 $\pm$ 1434        | 4926 $\pm$ 2984*         |
| <b>LYMPHOCYTES</b>       |                        |                        |                          |
| 1985                     | 2739 $\pm$ 883         | 2345 $\pm$ 860*        | 2607 $\pm$ 915           |
| 1986                     | 2785 $\pm$ 1131        | 2811 $\pm$ 981         | 2691 $\pm$ 927           |
| 1987                     | 2972 $\pm$ 950         | 2915 $\pm$ 863         | 2749 $\pm$ 1054          |
| <b>MONOCYTES</b>         |                        |                        |                          |
| 1985                     | 309 $\pm$ 168          | 229 $\pm$ 127*         | 321 $\pm$ 177            |
| 1986                     | 294 $\pm$ 189          | 301 $\pm$ 169          | 361 $\pm$ 251            |
| 1987                     | 323 $\pm$ 240          | 307 $\pm$ 203          | 429 $\pm$ 311*           |
| <b>BASOPHILS</b>         |                        |                        |                          |
| 1985                     | 12 $\pm$ 35            | 18 $\pm$ 38            | 12 $\pm$ 32              |
| 1986                     | 40 $\pm$ 57            | 47 $\pm$ 59            | 60 $\pm$ 74              |
| 1987                     | 53 $\pm$ 70            | 53 $\pm$ 58            | 63 $\pm$ 71              |
| <b>EOSINOPHILS</b>       |                        |                        |                          |
| 1985                     | 261 $\pm$ 216          | 284 $\pm$ 207          | 273 $\pm$ 238            |
| 1986                     | 365 $\pm$ 426          | 297 $\pm$ 310          | 343 $\pm$ 322            |
| 1987                     | 310 $\pm$ 267          | 293 $\pm$ 326          | 238 $\pm$ 239            |
| <b>PLATELETS, MEN</b>    |                        |                        |                          |
| 1985                     | 261 $\pm$ 75 (n=38)    | 242 $\pm$ 57 (n=20)    | 271 $\pm$ 51 (n=45)      |
| 1986                     | 252 $\pm$ 54 (n=33)    | 240 $\pm$ 43 (n=24)    | 289 $\pm$ 66* (n=43)     |
| 1987                     | 266 $\pm$ 76 (n=35)    | 240 $\pm$ 54 (n=20)    | 266 $\pm$ 55 (n=41)      |
| <b>PLATELETS, WOMEN</b>  |                        |                        |                          |
| 1985                     | 271 $\pm$ 61 (n=56)    | 277 $\pm$ 66 (n=28)    | 299 $\pm$ 72* (n=55)     |
| 1986                     | 276 $\pm$ 71 (n=44)    | 291 $\pm$ 84 (n=30)    | 328 $\pm$ 81* (n=55)     |
| 1987                     | 273 $\pm$ 67 (n=47)    | 261 $\pm$ 51 (n=28)    | 308 $\pm$ 73* (n=49)     |
| <b>HEMOGLOBIN, MEN</b>   |                        |                        |                          |
| 1985                     | 14.5 $\pm$ 1.4         | 14.8 $\pm$ 0.8         | 14.9 $\pm$ 1.2           |
| 1986                     | 14.9 $\pm$ 1.6         | 14.7 $\pm$ 1.0         | 15.3 $\pm$ 1.3           |
| 1987                     | 14.4 $\pm$ 1.1         | 14.6 $\pm$ 1.1         | 15.2 $\pm$ 1.3*          |
| <b>HEMOGLOBIN, WOMEN</b> |                        |                        |                          |
| 1985                     | 13.0 $\pm$ 1.2         | 12.9 $\pm$ 1.2         | 12.6 $\pm$ 1.2*          |
| 1986                     | 13.0 $\pm$ 1.6         | 13.1 $\pm$ 1.4         | 12.8 $\pm$ 1.6           |
| 1987                     | 13.1 $\pm$ 1.3         | 13.3 $\pm$ 0.8         | 13.0 $\pm$ 1.2           |

\*Significantly different, by t-test analysis, from equivalent values of the Comparison group. The only level of significance tested was  $p < 0.05$ .

**TABLE 2: THYROID SURGERIES, 1985-1987**

| Identification<br>Number & Group | Age at<br>Diagnosis | Sex | Year of<br>Surgery | Consensus Diagnosis*  |
|----------------------------------|---------------------|-----|--------------------|---|
| 67 - Rongelap                    | 45                  | F   | 1985               | Papillary/follicular carcinoma<br>plus occult papillary carcinoma |
| 822 - Comparison                 | 41                  | M   | 1985               | Normal  |
| 2172 - Utirik                    | 45                  | F   | 1985               | Follicular adenoma  |
| 2172 - Utirik                    | 34                  | F   | 1985               | Occult papillary carcinoma  |
| 2225 - Utirik                    | 39                  | F   | 1985               | Adenomatous nodule  |
| 2251 - Utirik                    | 37                  | F   | 1986               | Follicular adenoma plus occult<br>papillary carcinoma             |

\* Majority diagnoses, based on interpretations by: Dr. L.V. Ackerman, Health Sciences Center, SUNY, Stony Brook, NY; Dr. W.A. Meissner, formerly with New England Deaconess Hospital, Boston, MA; Dr. A.L. Vickery, Massachusetts General Hospital, Boston, MA; Dr. L.B. Woolner, Mayo Clinic, Rochester, MN.

**TABLE 3: THYROID NODULES DIAGNOSED AT  
SURGERY THROUGH 1987**

|                    | Adenomatous<br>nodules | Adenomas | Papillary<br>cancers | Follicular<br>cancers | Occult<br>cancers |
|--------------------|------------------------|----------|----------------------|-----------------------|-------------------|
| Rongelap (67)*     | 17                     | 2        | 5                    | -                     | 1                 |
| Ailingnae (19)*    | 4                      | -        | -                    | -                     | 1                 |
| Utirik (167)*      | 11                     | 4        | 4                    | 1***                  | 5                 |
| Comparison (227)** | 4                      | 1        | 2                    | -                     | 2****             |

**NOT INCLUDED** are the following unoperated (and therefore unconfirmed) nodules: Rongelap — 1; Ailingnae — 1; Utirik — 1; Comparison — 5.

**INCLUDED** are all consensus diagnoses of a panel of consultant pathologists; two different lesions were detected in one person from Rongelap, one from Ailingnae, and two from Utirik.

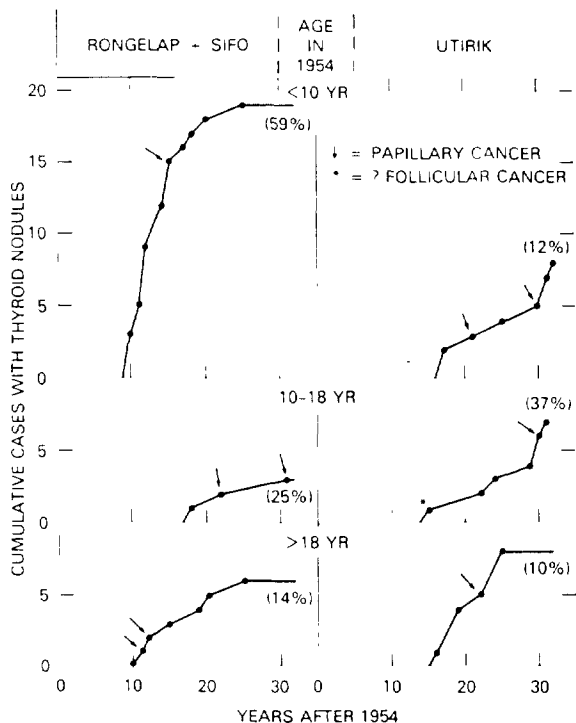
\* Number of persons (including those *in utero*) who were originally exposed.

\*\* This number includes all persons who have been in the Comparison group since 1957 (see page 18). Some have not been seen for many years; others were added as recently as 1976

\*\*\* Equally divided opinion in one case, follicular carcinoma vs. atypical adenoma

\*\*\*\* Majority opinion in one case; occult papillary carcinoma vs. follicular carcinoma. The same patient had lymphocytic thyroiditis.

The cumulative experience of benign plus malignant nodule development as a function of age at exposure shows clearly the increased susceptibility of the younger population to nodule induction (Fig. 3). Most benign nodules and all the thyroid carcinomas have occurred in females. It was noted (Robbins and Adams, 1989) that the prevalence of thyroid carcinomas compared to benign nodules (15%) was lower than that reported following medical x-ray therapy (about 30%).



**Fig. 3:** The accrual of cases with thyroid nodules and thyroid cancer in the exposed Rongelap population as a function of age at the time of exposure in 1954. The <10 year group includes exposure *in utero*. Two cases of thyroid atrophy without nodule formation (2 Rongelap boys, <10 years of age) are excluded. (Figure taken from Robbins and Adams, 1989).

It appears that there is an inverse correlation between the radiation dose absorbed by the thyroid and the time after exposure for development of the benign adenomatous nodules (Fig. 4). However, since the thyroid-absorbed radiation dose was determined primarily by age at exposure (children receiving greater doses than

adults), another interpretation of Fig. 4 is that the time for development of adenomatous nodules following radiation exposure varies directly with age at exposure.

### Nonthyroidal tumors

During the period 1985 through 1987, deaths attributable to cancer occurred in three exposed persons, all from Utiirik. The types of tumors were: lung cancer, hepatoma, and meningioma. During the same period there were three cancer-related deaths in the unexposed population, the tumor types being: colon carcinoma, hepatoma, and myelodysplastic syndrome.

Additional tumor diagnoses resulted from clinical investigation initiated at the time of medical team visits. These included a case of breast carcinoma (detected by mammography) and a case of colon carcinoma, both diagnosed in exposed Utiirik women. Both lesions were surgically resected and have a high probability of being cured. In addition, an epithelioma was removed from the skin of an exposed Rongelap woman, the site of the lesion being in the approximate area of a beta burn that developed soon after the 1954 exposure. This type of lesion, also termed basal cell carcinoma, is very common in the United States and is not included in the detailed cancer statistics published by the American Cancer Society (Silverberg and Lubera, 1987). However, its frequency in Marshallese is unknown.

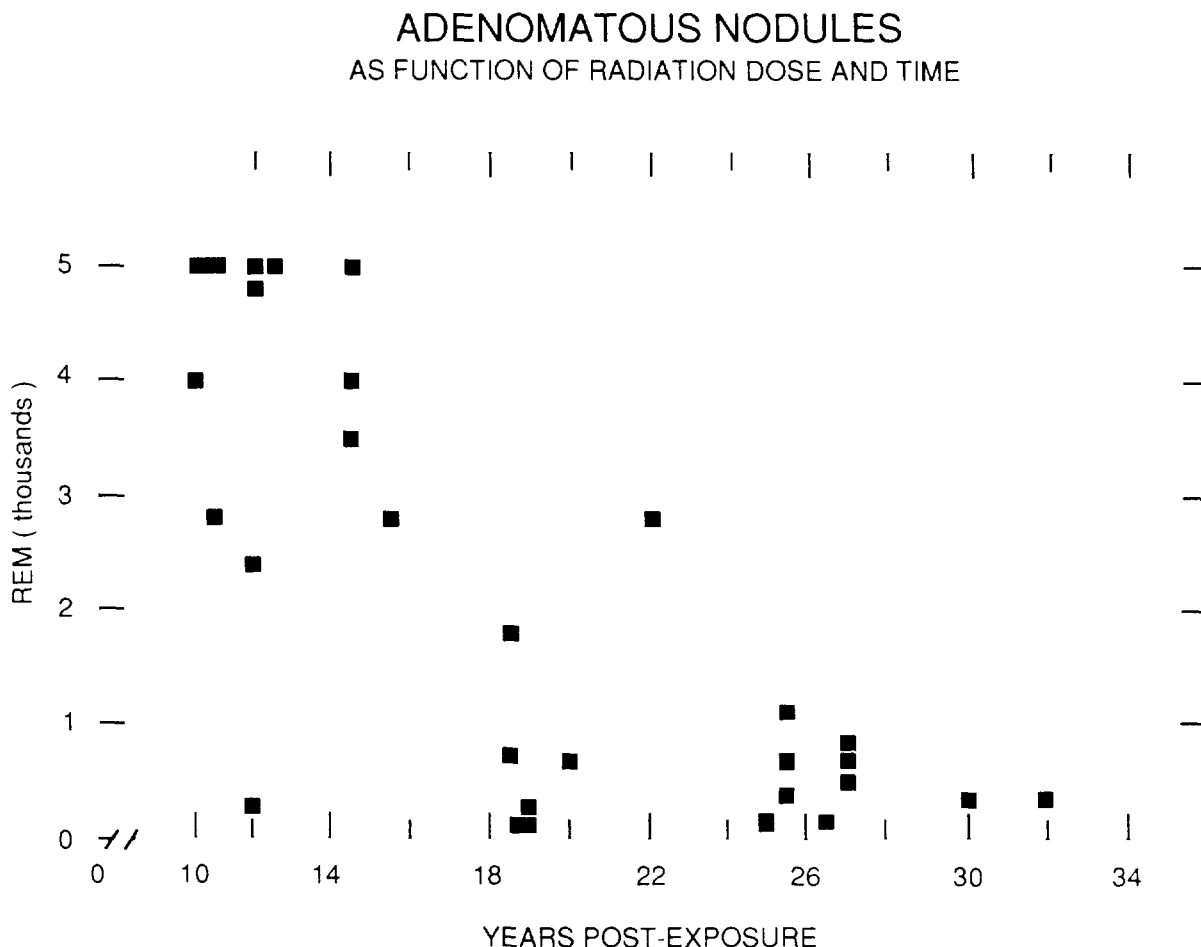
The development of two cases of hepatoma among the population served by the medical team requires comment. Two persons, one each from the Utiirik and the Comparison groups, died from this tumor during the period covered by this report. To this number should be added the death of another Utiirik man who died in 1984 from complications of cirrhosis (Adams et al., 1985), for he, like one of the hepatoma patients, had hepatitis B surface antigen detected in his serum. Studies have demonstrated an association between hepatitis B surface antigenemia and hepatoma, cirrhosis, and chronic active hepatitis (Beasley et al., 1981). Early BNL observations revealed that infection with hepatitis B virus is nearly universal among Marshallese, as it is among many tropical populations, and that serological evidence of the infection is common in childhood. In view of the



two fatalities that might be causally linked to hepatitis B virus, infection with this organism must be considered a public health problem of great concern. The Marshall Islands Medical Program annually tests all persons previously shown to be hepatitis B surface antigen-positive for the presence of alpha-fetoprotein, a tumor marker for hepatoma. Should an elevated level be detected the affected subject would be promptly referred for evaluation in the hope that early detection might permit curative resection of a localized lesion (Heyward et al., 1984).

The question arises as to whether the exposed Marshallese are at increased risk for the late complications of hepatitis B. This problem was

discussed previously (Adams et al., 1986), and it was noted that the prevalence of hepatitis B surface antigenemia was 3.3% in the Rongelap group, 18.8% in the Utirik group, and 10.5% in the Comparison group. There is evidence suggesting an association between radiation dose and prevalence of cirrhosis, but not hepatoma, in survivors of the atomic bombings in Japan (Asano et al., 1982). Assuming that two of the three deaths from hepatoma and cirrhosis in Marshallese resulted from chronic hepatitis B infection, the frequency of hepatitis B-related deaths, as percent of hepatitis B surface antigen-positive persons is: exposed Rongelap - 0% (0/2); exposed Utirik - 9.5% (2/21); Comparison group - 0% (0/10).



**Fig. 4:** The time required to develop adenomatous nodules following radiation exposure appears, in this graph, to be dose-related. However, the thyroid-absorbed radiation dose was highly dependent on the age at exposure.

### Autoimmune thyroid injury:

Radiation-induced thyroid hypofunction, diagnosed in fourteen exposed Rongelap individuals, was not found to be increased among Japanese A-bomb survivors. This difference reflects the larger dose absorbed by thyroids of the Marshallese, a consequence of ingestion of radioiodines. The question arises as to whether thyroid hypofunction in the exposed Marshallese is a consequence not only of direct radiation injury, but also of immunologic damage. Immunologic studies by the Radiation Effects Research Foundation found that Japanese A-bomb survivors greater than fifteen years of age at exposure had a significant decrease in mixed lymphocyte culture response that was inversely related to radiation dose (Akiyama et al., 1987), and lymphocyte responses to phytohemagglutinin decreased more rapidly with age in persons who received more than 200 rad. However, the immunological responses of aging Japanese A-bomb survivors do not appear to have been affected by radiation exposure (Bloom et al., 1988), nor does there appear to be an increase in diseases associated with autoimmunity in the exposed Japanese population.

Immunologic damage to the thyroid is mediated, in part, by circulating autoantibodies that are apparently cytotoxic. Antimicrosomal antibodies are important in the diagnosis of autoimmune thyroiditis, a disease process commonly progressing to hypothyroidism (Frey, 1987). Antithyroglobulin antibodies are far less specific an indicator of thyroid autoimmune

disease, but are useful as a screening test. Hypothyroidism is often quite subtle and difficult to diagnose, and any marker that might identify a population at risk for subsequent hypothyroidism would be clinically useful. Therefore 231 Marshallese sera collected in March 1987 were tested for the presence of antithyroglobulin and antimicrosomal antibodies in the laboratory of Dr. Harry Maxon. Fifty-five sera were from the Rongelap-exposed, 94 were from Utirik-exposed, and 82 were from the Comparison group. Two persons had data consistent with the diagnosis of autoimmune thyroid disease (Table 4), and both were in the Comparison group. One was a 38-year-old woman who had Grave's disease with hyperthyroidism diagnosed in 1980 that was treated with <sup>131</sup>I. Her serum contained both types of antibodies in 1980 as well as in 1987. The other person, a 32-year-old woman, had an antithyroglobulin antibody level of 35 U/l. She has Sheehan's syndrome, present since 1975 following postpartum hemorrhage. In addition, six persons had nondiagnostic but slightly elevated levels of antithyroglobulin antibodies, two from Rongelap and four from Utirik. None have clinical evidence of autoimmune thyroid disease, although three have had thyroid lobectomies for benign nodules. The lack of evidence for an increase in autoimmune thyroid disease among the exposed Marshallese is consistent with the findings of Radiation Effects Research Foundation studies. In a 30-year followup of persons less than 20 years of age at the time of exposure to the atomic bombings in Japan, no difference was detected in the preval-

**TABLE 4: ANTITHYROID ANTIBODIES IN THE DIFFERENT RADIATION EXPOSURE GROUPS.**

| Exposure group (n) | Elevated antithyroglobulin antibodies* | Percent elevated |
|--------------------|--|------------------|
| Rongelap (55)      | 2                                      | 4%               |
| Utirik (94)        | 4                                      | 4%               |
| Comparison (82)    | 2**                                    | 2%               |

\* The levels ranged between 6 and 11 U/l, with normal levels being  $\leq 5$  U/l.

\*\* One subject had elevated antimicrosomal antibodies (35 U/l) and a history of Grave's disease with hyperthyroidism.

ence of antithyroglobulin antibodies in unexposed versus exposed groups (Morimoto et al., 1987). In addition, no difference in the prevalence of chronic thyroiditis was found in children considered exposed or unexposed to radioactive fallout in Utah and Nevada (Rallison et al., 1974). Notably, in that study the prevalence of elevated titers of antithyroglobulin antibodies in children with "normal" thyroids was 4.8%. Hypothyroidism is common in aging populations, and in the Framingham Heart Study a clearly elevated thyrotropin (TSH) level was found in 4.4% of persons older than 60 years (Sawin et al., 1985a). The prevalence of antimicrosomal antibodies also increases with age: two-thirds of elderly persons with evidence of thyroid hypofunction had significant levels of antimicrosomal antibodies (Sawin et al., 1985b). The Marshallese data suggest that autoimmune thyroid disease is not common in that population, regardless of a history of radiation exposure.

## NONCANCEROUS THYROID MORBIDITY IN EXPOSED MARSHALLESE

The late somatic effects of exposure to ionizing radiation have been equated with cancer induction, the ultimate measure of those effects being expressed in mortality. Since cancer mor-

talidity from radiation exposure is low when compared to naturally occurring cancer mortality it is not surprising that there is no observed increase in mortality among the radiation-exposed Marshallese. Nevertheless, much attention has been addressed to their cancer risk. On the other hand, limited attention has been given to morbidity from nonmalignant disease, principally of the thyroid, as a late consequence of radiation exposure, and yet these lesions have been of great clinical importance (Table 5).

### A. Thyroid surgery:

Twenty-six (30 %) of the Rongelap group and eighteen (11%) of the Utirik group have had surgery for thyroid nodules that were ultimately found to be benign. The types of thyroid nodules found in the exposed population since 1963 can be grouped into cancers, adenomas, and adenomatous nodules. Cancers and adenomas are neoplasms. Adenomatous nodules, which, like adenomas, are benign, are not properly categorized as neoplasms. Histologically, they are hyperplastic lesions. In the exposed population both benign nodules and thyroid hypofunction display a similar correlation with radiation dose (Fig. 5), and, in contrast to thyroid cancer, adenomatous nodules have been very common (see Table 3). Adenomatous nodules are rarely of clinical significance, because they do not evolve into carcinoma. Surgery is necessary only to

**TABLE 5: LATE THYROID MORBIDITY UNRELATED TO DIAGNOSIS AND TREATMENT OF THYROID CANCER IN 253 RADIATION-EXPOSED MARSHALLESE.**

| Morbid event                       | Number of cases |
|------------------------------------|-----------------|
| Thyroid surgery for benign lesions | 44              |
| Hypothyroidism, radiogenic         | 15              |
| Hypothyroidism, postsurgical       | 21              |
| Hypoparathyroidism, postsurgical   | 2               |
| Recurrent laryngeal nerve palsy    | 1               |
| Pituitary tumor*                   | 2               |
| Total morbid events                | 85              |

\* Possible association (Adams et al., 1984).

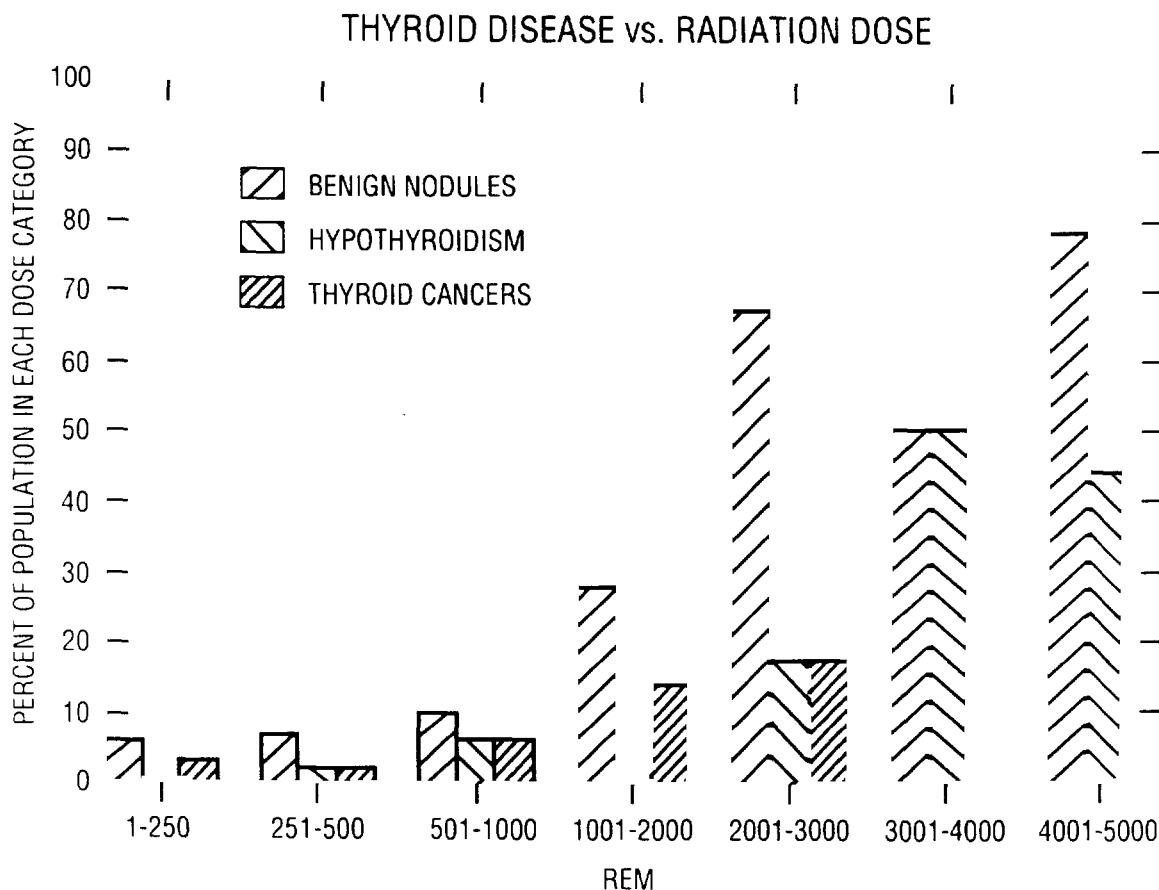
exclude that diagnosis. Nevertheless, the clinical evaluation required to establish a diagnosis is associated with its own morbidity. Prominent in this morbidity is thyroid surgery itself, a procedure that requires general anesthesia and results in a cosmetic defect and the unavoidable removal of some normal thyroid tissue.

#### B. Thyroid hypofunction, radiation-induced:

Overt hypothyroidism was diagnosed in two Rongelap boys who were infants at the time of exposure (Sutow et al., 1965). In addition, sub-clinical hypothyroidism unrelated to thyroid surgery was confirmed in twelve other Rongelap persons (Larsen et al., 1982). In 1987 a Utirik man was diagnosed as biochemically hypothyroid. He was two years of age at the time of exposure, and he is the first exposed person from Utirik to have this diagnosis.

#### C. Hypothyroidism, postsurgical:

In 1972 to 1974 it was noted that 11 of 20 exposed persons from Rongelap who underwent surgery for removal of thyroid nodules had elevated levels of thyroid-stimulating hormone (TSH). Because this evidence of postsurgical hypofunction was more frequent than expected it was surmised that thyroid insufficiency might be developing in the exposed Rongelap population as a whole, rather than being limited to the two hypothyroid children diagnosed some ten years earlier (Sutow et al., 1965). Such an event was likely to be clinically inapparent because all of that group had been placed on suppressive doses of thyroxin since 1965 to prevent thyroid neoplasia. Therefore, after temporarily discontinuing thyroxin, a survey of thyroid function was undertaken, and twelve persons were found to have biochemical evidence of thyroid insuffi-



**Fig. 5:** Thyroid-absorbed radiation dose vs. benign thyroid nodules, carcinoma, and hypofunction.

ciency. Retrospective testing of six persons who had thyroid hypofunction after thyroid surgery revealed the hypofunction had been present earlier (Larsen et al., 1982).

The development of thyroid hypofunction in the exposed individuals continues to be a cause for concern. While the routine use of suppressive doses of thyroxin should render this concern moot, it was noted that, based on medical history or results of annual TSH testing, somewhat more than forty percent of exposed persons who are supposed to be taking thyroxin have evidence of irregular or noncompliance with the prescribed medication regimen (Adams et al., 1983). It is desirable to minimize loss of thyroid tissue at surgery insofar as it is deemed clinically safe to do so: in fact, this has been the practice of the thyroid surgery consultant to the Marshall Islands Medical Program for almost twenty years.

Despite efforts to mitigate loss of thyroid tissue, however, there continues to be evidence of an inordinantly high frequency of postsurgical thyroid hypofunction among the exposed population. Table 6 shows data obtained through 1987 illustrating this point. An increase in frequency of postsurgical thyroid hypofunction with increase in the 1954 thyroid radiation dose is apparent, even though all thyroid surgery patients were advised to take thyroxin. However, the data in Table 6 must represent a minimum estimate of the prevalence of postsurgical thyroid hypofunction. In contrast to the study by Larsen et al. (1982), thyroxin was not pur-

posely discontinued before testing. Therefore, except for those relatively few instances in which selected individuals were asked not to take thyroxin for four to six weeks prior to thyroglobulin testing or thyroid scanning, elevated TSH levels were apparent only because of non-compliance. Some persons may have had normal TSH levels after surgery only because they are adhering satisfactorily to the prescribed thyroxin regimen.

It is unlikely that the differences in prevalence of postsurgical thyroid hypofunction among the groups result from different degrees of compliance in taking thyroxin after surgery. Furthermore, it is likely that, on the average, the extent of resection of thyroid tissue was greater in the unexposed persons undergoing thyroid surgery than in exposed individuals because of concern that the latter were more likely to have impaired thyroid reserve. As Table 6 shows, this concern was well-founded. Although present data are without doubt quantitatively inaccurate, they are likely to be qualitatively adequate.

The distinction between these data and those of Larsen et al. (1982) is that, whereas thyroid hypofunction was found by the latter group to antedate thyroid surgery (as documented by retrospective analysis of stored sera collected before institution of thyroxin suppression in the exposed Rongelap group), the present data reveal an inordinantly high frequency of postsurgical thyroid hypofunction in exposed persons with previously normal TSH levels. The importance of this finding is that there appears

**TABLE 6: MARSHALLESE WITH PREVIOUSLY NORMAL TSH LEVELS WHO HAVE DEVELOPED ELEVATED LEVELS FOLLOWING THYROID SURGERY.**

| Exposure group | Adult thyroid dose (rad)* | Number with surgery | Number with hypothyroidism** | Percent |
|----------------|---------------------------|---------------------|------------------------------|---------|
| Rongelap***    | 1200                      | 23                  | 14                           | 61      |
| Utirik         | 160                       | 25                  | 7                            | 28      |
| Comparison     | none                      | 11                  | 1                            | 8       |

\* Average estimated dose for an adult male.

\*\* Biochemical evidence of thyroid hypofunction as indicated by at least two determinations of thyroid stimulating hormone  $\geq 7.0$  uU/1. Normal values are less than 6.0 uU/1.

\*\*\* Routine thyroxin suppression prescribed.

to be significantly diminished thyroid reserve in many exposed persons, and, although this diminution is not apparent from routine TSH testing, it frequently may be made clinically significant by thyroid surgery. The extent of the problem cannot be accurately assessed with the data at hand because of the variability in compliance with the taking of the prescribed thyroxin suppression, and because no clinical benefit would accrue to the exposed population from discontinuing thyroxin for the purpose of proving the point. Nevertheless, a 61% prevalence of postsurgical thyroid hypofunction is reason for great concern in view of the high frequency of benign thyroid nodules in the exposed population.

#### **D. Postsurgical hypoparathyroidism:**

In two thyroid surgery patients transient postsurgical hypocalcemia was observed. However, two other Rongelap women developed chronic hypoparathyroidism requiring replacement therapy since undergoing thyroid surgery. In one the deficiency was diagnosed postoperatively and has not resolved. In the other the diagnosis was first made twenty years following surgery. Both surgeries were performed on Guam during the early years of the medical program. Postsurgical hypoparathyroidism is not an unusual complication of extensive thyroid surgery, occurring in up to 20% of patients. However, in experienced hands the frequency of postsurgical hypoparathyroidism is much lower.

#### **E. Laryngeal nerve injury:**

One Rongelap man has a mild but definite impairment in speech resulting from recurrent laryngeal nerve injury, a well-known complication of thyroid surgery. This is not a common complication, occurring in perhaps 1% of patients. As with postsurgical hypoparathyroidism, its frequency depends greatly on the experience of the surgeon and the extent of the surgery.

#### **F. Pituitary tumor formation:**

Two women exposed as young children, one from Rongelap and one from Utirik, have developed pituitary tumors. These tumors are usually benign, causing disease, in part, because of their expansion inside a rigid structure. There is no known direct association between radiation exposure and development of pituitary tumor, but there are reasons to suspect that pituitary tumor formation may be a consequence of thyroid injury (Adams et al., 1984).

In summary, hypothyroidism and subclinical thyroid hypofunction, benign thyroid nodule formation, thyroid surgery with its attendant risks and complications, an excessive prevalence of thyroid hypofunction after thyroid surgery, and possibly pituitary tumors can be considered adverse delayed consequences of radiation injury in the exposed Marshallese. The tally comes to 85 morbid events in 253 persons. In contrast, the only evidence for a "stochastic" effect of radiation exposure has been an increase in thyroid cancers in the Rongelap population, none of whom yet have evidence of residual disease. While several nonthyroidal cancers known to be inducible in humans by external ionizing radiation have been documented in the exposed population, similar cancers have occurred in the unexposed Comparison population of Marshallese. Therefore, one may conclude that in the Marshallese experience the delayed expression of nonmalignant morbidity due to irradiation has indeed been great and far exceeds that of malignant disease.

## **REVIEW OF CANCER IN THE COMPARISON POPULATION**

In earlier BNL publications neoplasms of the exposed population were compared to those of an unexposed "Comparison" population with a similar age and sex distribution. However, since the last report, which brought the period of medical coverage up to December 31st, 1984, concerns have been voiced about present-day safety of habitation on Rongelap island. An analysis of the current radiation risk of Rongelap habitation is not a function of the Marshall Islands Medical Program, which is a clinical program devoted to aspects of health care for persons acutely exposed to radioactive fallout in 1954. Nevertheless, medical information collected over many years concerning the unexposed Rongelap people has been requested by different groups who are involved in assessing that risk. To assist them and others who may wish to review the medical experience of the Comparison population, a summary of diagnoses of neoplastic disease is presented here. It is essential to realize that whatever radiation risk exists today on Rongelap is quite distinct from that incurred by 86 Rongelap inhabitants and 167 Utirik inhabitants during the two-day exposure to Bravo fallout in 1954. The reasons for this statement are given below.

The selection of the Comparison group began in 1957 at Majuro when the group was initiated with 86 individuals matched approximately for sex and age with the exposed group of 86 individuals. Members of the Comparison group were examined periodically thereafter at Rongelap or elsewhere along with members of the exposed Rongelap population. During 1958-59, after the return to Rongelap island, the number of persons actively enrolled in the Comparison group was increased to about 150. During the following years up to 1974, another 31 persons were added. In 1974-76, to make up for more persons lost to followup or deceased, another 32 persons were added. No additions to the roster have been made since that time. When all enrollees are tallied, including those who have discontinued their participation in the annual medical examinations, 227 persons have been examined at one time or another as part of the Comparison group. Although some of the group were lost to followup, there were 63 deaths recorded through 1987. Some deaths may have occurred in those lost to followup that were not brought to the attention of the Marshall Islands Medical Program. Furthermore, the death rate in subsequently added subgroups may not be the same as that for persons in 1957. There is no way to determine if there is any bias introduced into mortality statistics as a consequence of these events which were beyond the control of the program. However, two points can be made. First, since it is cancer mortality which is specifically in question, cancer deaths can be expressed in terms of total known deaths, thereby controlling to some extent for uncertainties in the determination of total deaths. Therefore, on the basis of information made available to the Marshall Islands Medical Program, 8 of the 63 known deaths (13%) may have been due to malignant disease. In the United States cancer mortality accounts for 22% of total mortality (Silverberg and Lubera, 1987), and in the exposed Rongelap group it accounts for 19% of total mortality (5 of 26 deaths). Second, cancer deaths can be expressed in person/years of observation, thereby controlling somewhat for persons lost to followup. When this is done the cancer death rate for the 33-year observation period is 171/100,000 (8 possible cancer deaths in 4669 person/years) for the Comparison group overall and 187/100,000 (4 possible cancer deaths in 2136 person/years) for the 86

persons in the original 1957 Comparison group. The similarity of these numbers does not suggest the introduction of bias in death rates in subsequent additions in the Comparison population. For the Rongelap exposed population, which was statistically similar in age and sex distribution to the Comparison group when evaluated in 1982 (Adams et al., 1983), this number is 234/100,000 (5 possible cancer deaths in 2139 person/years). The confirmed or presumptive cancer diagnoses in the Comparison group are given in Table 7, along with cancer deaths in the exposed Rongelap population.

Table 8 contrasts the distribution of possible cancer deaths in the Comparison group according to years of residence on Rongelap with that of the exposed population. One of the eight persons dying of possible cancer in the Comparison group was never known to be present on the island. Furthermore, six of the eight spent only a short time on Rongelap. However, for those six that short time lay between 1958 and 1961, a period when residual radioactivity would have been higher than in subsequent years. One hundred fifty-one persons in the Comparison population were known to be on Rongelap at some time between 1958 and 1961. Of the six that ultimately died of possible cancer, four were among forty-two who were not on Rongelap after 1961, whereas two were among the one hundred-and-nine that were seen on Rongelap at a later date (Table 9). It is a statistical oddity that even the latter two individuals were found on Rongelap only once after 1961.

There are several points that are relevant for those who would apply an epidemiologic analysis to these data:

1. Since the Marshall Islands Medical Program has not maintained a year-round medical presence on the different atolls where examinees may be found, causes of death were obtained in many instances from records and verbal accounts of health aides and family members living on those atolls and from records and death certificates at the Ebeye and Majuro hospitals. Autopsies are rarely performed in the Marshall Islands.

2. Of the eight deaths that clinically may have been cancer-related, confirmation by tissue diagnosis is available in only four. In the exposed Rongelap population only three of the five deaths attributed to cancer were confirmed.

Table 7 presents limited information relevant to the diagnosis of the cancers in the Comparison group, but all 8 cases have been described in greater detail in this or earlier BNL reports.

3. The most frequent lethal cancers in the United States are lung, breast, colon and leukemia/-lymphoma.

4. Areas where health care is limited often have increased mortality from noncancerous disease, and an increase in cancer incidence has been viewed as evidence of improved overall health of some populations because it reflects improvements in longevity.

5. Table 7 lists only deaths that might have been related to cancer. There have been two cases of thyroid cancer that have been diagnosed. The thyroid cancers, discussed elsewhere in this report, have not been a cause of death, and at

the present time there is no evidence of residual disease in either of the thyroid cancer patients.

6. In attempting to determine whether there has been an increase in cancer deaths in either the exposed or Comparison population one should note a Radiation Effects Research Foundation report on the Japanese exposed to atomic bombing. From 1950 to 1985, there had been 5936 cancer deaths among 75991 persons in the LSS (Life Span Study) cohort. Three hundred and forty of the cancer deaths (6% of the total cancer deaths) are thought to be attributable to the 1945 radiation exposure (Preston and Pierce, 1988). The small size of the exposed and Comparison Marshallese groups, the smaller number of cancer deaths, and naturally occurring fluctuations in disease incidence will make statistical detection of any excess cancer mortality impossible in these populations.

**TABLE 7: POSSIBLE CANCER DEATHS IN THE RONGELAP EXPOSED AND COMPARISON (UNEXPOSED) POPULATION**

| ID#                        | Year of Death | Age at Death | Years on Rongelap* | Cancer Type | Confirmation                               |
|----------------------------|---------------|--------------|--------------------|-------------|--|
| <b>A. COMPARISON GROUP</b> |               |              |                    |             |  |
| 842                        | 1986          | 61           | 2                  | ? Hepatoma  | Not available                              |
| 846                        | 1986          | 63           | 4                  | Leukemia    | Yes  |
| 861                        | 1960          | 68           | 2                  | Cervix      | No. Normal pelvic exam in 3/59.            |
| 889                        | 1980          | 55           | 2                  | Breast      | Yes  |
| 975                        | 1985          | 65           | 2                  | ? Lymphoma  | "Atypical lymphoepithelioid proliferation" |
| 1005                       | 1984          | 51           | 2                  | Lung        | Yes (Smoker)                               |
| 1050                       | 1985          | 50           | 20**               | ? Colon     | No   |
| 1571                       | 1982          | 28           | 0***               | Astrocytoma | Yes  |
| <b>B. RONGELAP EXPOSED</b> |               |              |                    |             |  |
| 62                         | 1959          | 60           | 2                  | Ovary       | Yes  |
| 30                         | 1962          | 60           | 5                  | Cervix      | No   |
| 13                         | 1966          | 71           | 9                  | Uterus      | No   |
| 54                         | 1972          | 19           | 7                  | Leukemia    | Yes  |
| 68                         | 1974          | 64           | 16                 | Stomach     | Yes  |

\* Years of residence on Rongelap after rehabilitation of Rongelap island in 1957, as recorded in the medical records of the Marshall Island Medical Program or from personal history.

\*\* Added to Comparison group in 1964; did not live on Rongelap between 1957 and 1964

\*\*\* Added to Comparison group in 1976; residence prior to 1976 is not recorded.



**TABLE 8: DISTRIBUTION OF POSSIBLE CANCER DEATHS  
ACCORDING TO YEARS OF RESIDENCE ON RONGELAP**

| Years on<br>Rongelap       | Number of<br>Persons | Possible Cancer<br>Deaths  |
|----------------------------|----------------------|----------------------------|
| <b>A. COMPARISON GROUP</b> |                      |                            |
| 0-4                        | 135                  | 7                          |
| 5-9                        | 40                   | 0                          |
| 10-14                      | 20                   | 0                          |
| 15-19                      | 13                   | 0                          |
| 20-24                      | 10                   | 1                          |
| 25-28                      | 9                    | 0                          |
| Total                      | 227                  | 8 (13% of recorded deaths) |
| <b>B. RONGELAP EXPOSED</b> |                      |                            |
| 0-4                        | 8                    | 0                          |
| 5-9                        | 10                   | 0                          |
| 10-14                      | 12                   | 1                          |
| 15-19                      | 13                   | 0                          |
| 20-24                      | 30                   | 3                          |
| 25-28                      | 10                   | 1                          |
| Total                      | 83                   | 5 (19% of recorded deaths) |

**TABLE 9: COMPARISON AND EXPOSED GROUP  
— CANCER DEATHS**

| Group  | No. in<br>Group | Total<br>Deaths | Cancer<br>Deaths | Age at<br>Death |
|--|-----------------|-----------------|------------------|-----------------|
| A. Comparison  | 227             | 63*             | 8                | 28-68           |
| A.1 Resident on Rongelap <i>only</i><br>during '57-'61         | 42              | 12              | 4                | 55-68           |
| A.2 Resident in '57-'61 <i>and</i> for<br>some time thereafter | 109             | 32              | 2                | 51,63           |
| A.3 Resident <i>only after</i> '57-'61                         | 47              | 5               | 1                | 50              |
| A.4 Never on Rongelap  | 29              | 13              | 1                | 28              |
| B. Exposed in 1954   | 86              | 26**            | 5                |                 |
| B.1 Like A.1   | 8               | 3               | 1                | 60              |
| B.2 Like A.2   | 73              | 20              | 4                | 19-71           |
| B.3 Like A.3   | 1               | 0               | 0                |                 |
| B.4 Like A.4   | 1               | 0               | 0                |                 |

\* One death occurred five months after return to Rongelap.

\*\* Three deaths occurred prior to return to Rongelap in 1957

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# APPENDIX A

## PROFESSIONAL STAFF PARTICIPATING IN THE 1985-87 MARSHALL ISLANDS SURVEYS

| NAME         | PARTICIPATING<br>SURVEY              | SPECIALTY                               | AFFILIATION  |
|--------------|--------------------------------------|---|--|
| Adams, W.H.  | 3/85, 9/85, 3/86<br>9/86, 5/87, 9/87 | Internal Medicine<br>(Hematology)       | Brookhaven Natl. Lab.<br>Upton, NY 11973   |
| Anderson, J. | 5/87                                 | Internal Medicine<br>(Geriatrics)       | NY Bellevue Div. of<br>Geriatric Medicine<br>NY, NY 11016  |
| Arelong, T.  | 3/85, 9/85, 3/87                     | Nurse                                   | Armer Ishoda Memorial<br>Hosp., Majuro, MI 96960   |
| Barclay, P.  | 5/87                                 | Internal Medicine<br>(Allergy/Immun.)   | Central General Hosp.<br>Plainview, NY 11803<br>(Director, Emergency<br>Physicians)                              |
| Benes, S.    | 5/87                                 | Ophthalmology                           | Ohio State University<br>Medical School<br>Columbus, OH 43210  |
| Beydoun, S.  | 3/86                                 | Obstetrics/Gyn.                         | Univ. of Miami<br>School of Medicine<br>Miami, FL 33101  |
| Bliss, M.    | 3/85, 9/87                           | Internal Medicine<br>(Gastroenterology) | Boston City Hospital<br>Boston, MA 02118   |
| Cheatham, W. | 3/86                                 | Internal Medicine<br>(Endocrinology)    | Walter Reed Army<br>Medical Center<br>Washington, D.C. 20012   |
| Dec, W       | 3/86                                 | Internal Medicine<br>(Cardiology)       | Harvard Medical School<br>Mass. Gen. Hospital<br>Boston, MA 02114  |
| Dobyns, B.   | 3/85                                 | Surgery                                 | Case Western Reserve Univ.<br>Cleveland Gen. Hospital<br>Cleveland, OH 44109                                     |
| Engle, J.    | 3/85, 9/85, 3/86                     | Family Practice                         | Vet. Adm. Med. Center<br>Martinsburg, WV 25401<br>(formerly BNL Resident<br>Physician stationed at<br>Kwajalein) |
| Ferguson, F. | 9/85                                 | Pediatric Dentistry                     | School of Dental Medicine<br>State Univ. of New York at<br>Stony Brook, NY 11791                                 |
| Giorgio, B.  | 3/85, 5/87                           | Gyn. Surgery                            | Private Practice<br>Pearl City, HI 96782   |
| Giorgio, L.  | 3/85                                 | Nurse                                   | Pearl City, HI 96782   |
| Greene, G.   | 9/85                                 | Pediatrics                              | Univ. of California<br>Irvine Medical Center<br>Orange, CA 92668   |

| <b>NAME</b>     | <b>PARTICIPATING<br/>SURVEY</b>      | <b>SPECIALTY</b>  | <b>AFFILIATION</b>   |
|-----------------|--------------------------------------|---|--|
| Harper, J.      | 9/86                                 | Family Practice   | Private Practice<br>Portland, ME 04103<br>(formerly BNL Resident<br>Physician stationed at<br>Kwajalein)           |
| Jacobs, D.      | 3/86                                 | Nurse   | Armer Ishoda Mem.<br>Hospital, Majuro, MI 96960  |
| Jensen, L.P.    | 3/85                                 | Obstetrics/Gyn.   | University of Miami<br>School of Medicine<br>Miami, FL 33101   |
| Kabua, J.       | 3/85, 9/85, 3/86<br>9/86, 5/87, 9/86 | Nurse   | Ebeye<br>Marshall Islands, 96960   |
| Kehne, S.       | 3/85, 3/86                           | Internal Medicine<br>(Pediatric Neurology)              | Boston City Hospital<br>Boston, MA 02118   |
| Kindermann, R.  | 3/85                                 | Ophthalmology   | Private Practice<br>Cherry Hill, NJ 08003  |
| Lakshmanan, M.  | 3/86, 5/87                           | Internal Medicine                                       | Natl. Institutes of Health<br>Bethesda, MD 20892   |
| Landsberger, E. | 3/86                                 | Obstetrics/Gyn.   | Albert Einstein College of<br>Medicine, Bronx, NY 10461  |
| Langrine, H.    | 3/85, 9/85, 3/86                     | Nurse   | Armer Ishoda Mem.<br>Hospital, Majuro, MI 96960  |
| MacKay, D.      | 5/87                                 | Internal Medicine<br>(Infectious Diseases)              | Dartmouth-Hitchcock<br>Medical Center<br>Hanover, NH 03756   |
| Maisel, J.      | 3/85                                 | Ophthalmology   | State Univ. of New York at<br>Stony Brook, NY 11791  |
| Maxon, H.       | 5/87                                 | Internal Medicine<br>(Nuclear Medicine<br>Thyroidology) | University of Cincinnati<br>Medical Center<br>Cincinnati, OH 45267   |
| McClintock, C.  | 3/85                                 | Internal Medicine<br>(Gastroenterology)                 | Boston City Hospital<br>Boston, MA 02118   |
| Melkonian, R.   | 5/87                                 | Obstetrics/Gyn.   | Stony Brook Univ. Hospital<br>SUNY at Stony Brook,<br>NY 11791   |
| Mellan, M.      | 5/87                                 | Nurse   | Armer Ishoda Mem. Hosp.<br>Majuro, Mashall Is., 96960  |
| Pacifico, A.    | 5/87                                 | Internal Medicine<br>(Cardiology)                       | Baylor College of Medicine<br>Houston, TX 77030  |
| Panebianco, R.  | 3/85                                 | Internal Medicine                                       | Private Practice<br>Southampton, NY 11968  |
| Rittmaster, R.  | 3/85                                 | Internal Medicine<br>(Endocrinology)                    | Natl. Institutes of Health<br>Bethesda, MD 20892<br>(Formerly BNL Resident<br>Physician stationed at<br>Kwajalein) |

| NAME         | PARTICIPATING<br>SURVEY | SPECIALTY                          | AFFILIATION   |
|--------------|-------------------------|------------------------------------|---|
| Stewart, D.  | 9/85                    | Pediatrics                         | University of California<br>Irvine Medical Center<br>Orange, CA 92668 |
| Symes, D.    | 5/87                    | Ophthalmology                      | Private Practice<br>Tucson, AZ 85718                                  |
| Ugolini, V.  | 5/87                    | Internal Medicine<br>(Cardiology)  | University of Texas<br>Southwestern Medical Ctr.<br>Dallas, TX 75235  |
| Werth, V.    | 3/86                    | Internal Medicine<br>(Dermatology) | New York University<br>Dept. of Dermatology<br>NY, NY 10017           |
| Williams, K. | 3/86                    | Internal Medicine                  | Cornell University<br>Department of Medicine<br>NY, NY 10032          |

# TECHNICAL SPECIALISTS PARTICIPATING IN THE 1985-87 MARSHALL ISLANDS SURVEYS

| NAME              | PARTICIPATING<br>SURVEY              | AFFILIATION  |
|-------------------|--------------------------------------|--|
| Adams, Diana      | 3/85                                 | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Ankien, Risong    | 3/85, 5/87                           | Armer Ishoda Memorial Hospital<br>Majuro, Marshall Islands 96960                             |
| Boyd, Lindora     | 9/85                                 | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Bullis, James Jr. | 3/86                                 | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| deBrum, Reynold   | 3/85, 9/85, 3/86<br>9/86, 5/87, 9/87 | U.S. Department of Energy<br>Majuro, Marshall Islands 96960                                  |
| Duhaime, Susan    | 5/87                                 | Stony Brook University Hospital<br>State University of New York at<br>Stony Brook, NY 11791  |
| Emos, Helmer      | 3/85, 9/85, 3/86<br>9/86, 5/87, 9/87 | Medical Department<br>Brookhaven National Laboratory<br>Stationed at Ebeye, Marshall Islands |
| Gideon, Kalman    | 3/86                                 | Armer Ishoda Memorial Hospital<br>Majuro, Marshall Islands 96960                             |
| Heotis, Peter     | 3/85, 9/85, 3/86<br>9/86, 5/87, 9/87 | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Heinrichs, John   | 5/87                                 | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Jacob, Stanley    | 3/85, 3/86                           | Ebeye Hospital<br>Ebeye, Marshall Islands 96960  |
| Lehman, William   | 9/86, 5/87, 9/87                     | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Saul, Joe         | 3/85, 9/85, 3/86                     | Armer Ishoda Memorial Hospital<br>Majuro, Marshall Islands 96960                             |
| Scott, William    | 3/85, 9/85, 3/86<br>5/87, 9/87       | Medical Department<br>Brookhaven National Laboratory<br>Upton, NY 11973                      |
| Shoniber, Sebio   | 3/85, 9/85, 5/87                     | Armer Ishoda Memorial Hospital<br>Majuro, Marshall Islands 96960                             |
| Stravino, Michael | 3/85, 9/85, 3/86                     | Medical Department (Retired)<br>Brookhaven National Laboratory<br>Upton, NY 11973            |
| Tommy, Morris     | 5/87, 9/87                           | Armer Ishoda Memorial Hospital<br>Majuro, Marshall Islands 96960                             |

## APPENDIX B

Individual Marshallese laboratory data collected during the 1985, 1986, and 1987 medical surveys. (Identification numbers 1 to 86 belong to exposed persons of Rongelap and Ailingnae; numbers beginning at 2102 belong to the Utirik exposed; numbers from 805 through 1578 belong to the Comparison group).

### Abbreviations:

|       |   |  |
|-------|---|--|
| PID   | = | Brookhaven National Laboratory identification number |
| SEX   | = | 1 - Male; 2- Female                                  |
| AGE   | = | years  |
| WBC   | = | leukocyte count/ $\mu$ l                             |
| PMN   | = | neutrophil count/ $\mu$ l                            |
| BAND  | = | band forms/ $\mu$ l                                  |
| LYMPH | = | lymphocytes/ $\mu$ l                                 |
| MONO  | = | monocytes/ $\mu$ l                                   |
| EOS   | = | eosinophils/ $\mu$ l                                 |
| BASO  | = | basophils/ $\mu$ l                                   |
| PLT   | = | platelet count $\times 10^3$ / $\mu$ l               |
| HCT   | = | percent  |
| RBC   | = | erythrocytes $\times 10^3$ / $\mu$ l                 |
| MCV   | = | mean corpuscular volume in fl                        |
| HGB   | = | hemoglobin level in g/dl                             |
| TSH   | = | thyroid stimulating hormone level in $\mu$ U/l       |
| PRL   | = | serum prolactin in ng/ml                             |
| T4    | = | thyroxine in $\mu$ g/dl                              |
| TPR   | = | total protein in g/dl                                |
| ALB   | = | albumin in g/dl                                      |
| GLOB  | = | globulin in g/dl                                     |
| A/G   | = | albumin/globulin ratio                               |
| CAL   | = | calcium in mg/dl                                     |
| FBS   | = | fasting blood sugar in mg/dl                         |
| HBA1C | = | glycosylated hemoglobin A1C in percent               |



505175

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| PID  | SEX | AGE | WBC   | PMN  | COMPUTER<br>BAND | LYMPH | LISTING<br>MONO | OF 1985<br>EOS | RAW DATA<br>BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH    | PRL  | T  |
|------|-----|-----|-------|------|------------------|-------|-----------------|----------------|------------------|-----|------|------|-----|------|--------|------|----|
| 2    | 1   | 33  | 7900  | 4898 | 158              | 2133  | 318             | 318            | 79               | 224 | 42.9 | 4.46 | 96  | 15.0 | 16.60  | 4.5  | 10 |
| 4    | 1   | 70  | 9500  | 5890 | 95               | 2660  | 570             | 190            | 95               | 184 | 46.1 | 5.26 | 88  | 14.9 | 6.20   | 2.2  |    |
| 5    | 1   | 33  | 6100  | 2562 | 0                | 2989  | 244             | 305            | 0                | 281 | 42.7 | 4.51 | 95  | 14.1 | 5.00   | 2.3  |    |
| 7    | 1   | 66  |       |      |                  |       |                 |                |                  |     |      |      |     |      | 5.60   | 11.9 |    |
| 9    | 1   | 52  | 6900  | 3933 | 2001             | 828   | 138             | 276            | 0                | 245 | 43.6 | 4.46 | 98  | 15.2 | 3.20   |      | 6  |
| 10   | 1   | 55  | 10500 | 7245 | 105              | 2415  | 525             | 210            | 0                | 276 | 45.4 | 5.39 | 84  | 14.8 | 2.60   | 3.0  |    |
| 12   | 2   | 48  | 7600  | 3496 | 76               | 3496  | 228             | 304            | 0                | 410 | 40.3 | 4.27 | 94  | 13.2 | 5.10   | 2.7  |    |
| 14   | 2   | 56  | 5100  | 2856 | 51               | 1683  | 204             | 306            | 0                | 229 | 34.3 | 3.49 | 98  | 11.7 | 6.30   | 2.6  |    |
| 15   | 2   | 39  | 8900  | 3916 | 0                | 4539  | 356             | 89             | 0                | 309 | 42.1 | 4.46 | 94  | 13.6 | 35.00  | 21.7 |    |
| 16   | 1   | 71  | 4600  | 2484 | 138              | 1610  | 322             | 46             | 0                | 320 | 43.8 | 5.88 | 74  | 13.9 | 17.00  | 6.3  |    |
| 17   | 2   | 35  | 6400  | 3776 | 256              | 1792  | 384             | 128            | 64               | 196 | 46.9 | 5.04 | 93  | 12.9 | 2.50   | 16.1 |    |
| 18   | 2   | 53  | 5700  | 3078 | 171              | 1767  | 285             | 399            | 0                | 313 | 39.6 | 4.31 | 92  | 12.7 | 6.90   | 15.0 |    |
| 19   | 1   | 37  | 7300  | 4526 | 73               | 2044  | 219             | 438            | 0                | 202 | 45.1 | 5.98 | 75  | 14.3 | 68.00  | 12.9 | 3  |
| 20   | 1   | 38  | 8200  | 5658 | 82               | 2296  | 164             | 0              | 0                | 292 | 51.1 | 5.78 | 88  | 16.4 | 8.20   | 4.8  | 7  |
| 21   | 2   | 34  | 4300  | 2623 | 43               | 1032  | 172             | 430            | 0                | 220 | 41.1 | 5.04 | 82  | 13.7 | 2.60   | 17.2 |    |
| 22   | 2   | 47  | 6100  | 2745 | 122              | 2684  | 122             | 427            | 0                | 281 | 46.6 | 5.85 | 96  | 12.8 | 5.30   | 13.6 |    |
| 23   | 1   | 36  |       |      |                  |       |                 |                |                  |     |      |      |     |      |        |      |    |
| 24   | 2   | 45  | 7400  | 3700 | 0                | 2812  | 296             | 518            | 74               | 202 | 38.7 | 4.24 | 91  | 13.8 | 2.90   | 3.1  |    |
| 27   | 1   | 58  | 7500  | 3525 | 225              | 2925  | 225             | 525            | 75               | 243 | 43.2 | 4.36 | 99  | 14.8 | 3.10   | 1.3  |    |
| 34   | 2   | 76  | 7800  | 4680 | 390              | 2418  | 156             | 156            | 0                | 239 | 34.3 | 3.48 | 98  | 11.7 | 10.50  | 11.1 |    |
| 36   | 1   | 39  | 6200  | 3596 | 186              | 1984  | 372             | 82             | 0                | 272 | 47.3 | 4.69 | 101 | 15.6 | 5.00   | 4.3  | 8  |
| 37   | 1   | 52  | 4100  | 2050 | 41               | 1476  | 41              | 410            | 82               | 200 | 39.3 | 4.10 | 96  | 13.8 | 5.70   |      |    |
| 39   | 2   | 46  | 6200  | 3348 | 0                | 2294  | 372             | 186            | 186              | 320 | 40.4 | 4.27 | 93  | 12.4 | 5.00   |      |    |
| 40   | 1   | 61  | 4900  | 1862 | 49               | 2842  | 98              | 49             | 0                | 206 | 42.4 | 4.53 | 94  | 13.9 | 3.90   | 5.6  |    |
| 41   | 1   | 73  | 6500  | 3770 | 0                | 2080  | 130             | 520            | 0                | 186 | 44.0 | 4.61 | 95  | 13.9 | 6.00   | 4.5  |    |
| 42   | 2   | 34  | 7700  | 4466 | 0                | 2695  | 308             | 231            | 0                | 231 | 46.7 | 5.11 | 91  | 16.2 | 3.10   | 11.6 | 14 |
| 44   | 1   | 35  | 5000  | 2700 | 100              | 2050  | 100             | 50             | 0                | 260 | 45.8 | 5.40 | 85  | 14.8 | 6.20   | 3.2  | 9  |
| 49   | 2   | 48  | 6400  | 2496 | 64               | 3072  | 320             | 448            | 0                | 244 | 43.8 | 4.81 | 91  | 13.4 | 6.00   | 2.9  | 4  |
| 61   | 2   | 40  | 7400  | 3330 | 0                | 3922  | 148             | 0              | 0                | 368 | 41.2 | 4.68 | 90  | 13.7 | 35.00  | 7.1  |    |
| 63   | 2   | 67  | 6800  | 3332 | 204              | 2040  | 0               | 1166           | 0                | 256 | 39.9 | 4.24 | 94  | 13.1 | 4.60   | 3.8  |    |
| 65   | 2   | 33  | 4800  | 2496 | 48               | 1680  | 192             | 336            | 48               | 296 | 33.5 | 3.73 | 90  | 10.8 | 168.00 | 36.3 |    |
| 66   | 2   | 61  | 6800  | 3468 | 204              | 2652  | 204             | 272            | 0                | 241 | 38.7 | 4.20 | 92  | 12.7 | 10.30  | 3.9  |    |
| 67   | 2   | 45  | 7900  | 4187 | 316              | 3081  | 79              | 158            | 0                | 208 | 41.1 | 4.29 | 96  | 13.3 | 3.20   | 5.6  | 11 |
| 71   | 2   | 58  | 7000  | 2800 | 0                | 3360  | 350             | 490            | 0                | 198 | 38.7 | 4.19 | 92  | 13.0 | 8.50   | 5.3  |    |
| 72   | 2   | 39  | 7800  | 5018 | 0                | 1900  | 380             | 304            | 0                | 395 | 39.7 | 4.39 | 90  | 13.0 | 3.80   | 22.3 | 13 |
| 74   | 2   | 47  | 6900  | 2760 | 69               | 3450  | 345             | 207            | 69               | 304 | 47.5 | 5.30 | 90  | 16.1 | 3.40   | 5.5  | 16 |
| 75   | 2   | 43  | 11400 | 8208 | 342              | 2508  | 228             | 114            | 0                | 248 | 41.9 | 4.50 | 93  | 13.2 | 13.10  | 6.7  | 9  |
| 76   | 1   | 42  | 5000  | 1800 | 0                | 2700  | 200             | 250            | 50               | 155 | 43.5 | 4.41 | 99  | 14.8 | 3.30   |      | 6  |
| 77   | 1   | 56  | 5400  | 3564 | 162              | 1566  | 54              | 54             | 0                | 334 | 40.3 | 4.24 | 95  | 13.2 | 4.00   | 4.9  |    |
| 78   | 2   | 67  | 7800  | 3120 | 0                | 4368  | 78              | 234            | 0                | 320 | 40.0 | 4.03 | 99  | 13.3 | 3.60   | 4.7  |    |
| 79   | 1   | 71  | 7900  | 4582 | 79               | 2449  | 395             | 395            | 0                | 148 | 47.8 | 5.14 | 93  | 15.5 | 4.60   | 4.9  |    |
| 83   | 1   | 32  | 5400  | 2592 | 0                | 2052  | 324             | 324            | 0                | 265 | 46.7 | 4.75 | 98  | 16.5 | 2.80   | 4.3  | 8  |
| 85   | 1   | 31  | 8600  | 4644 | 0                | 3526  | 344             | 86             | 0                | 345 | 48.6 | 5.14 | 95  | 14.8 |        |      |    |
| 86   | 2   | 31  | 7000  | 5040 | 350              | 1190  | 140             | 280            | 0                | 232 | 31.1 | 3.38 | 92  | 10.8 | 4.60   |      |    |
| 8    | 2   | 33  | 11000 | 8910 | 330              | 1210  | 0               | 550            | 0                | 216 | 31.5 | 3.62 | 87  | 10.6 | 10.70  | 69.9 |    |
| 45   | 2   | 63  | 4500  | 2340 | 135              | 1305  | 225             | 450            | 45               | 296 | 34.7 | 3.87 | 95  | 12.1 | 3.10   | 5.2  |    |
| 53   | 2   | 39  | 6800  | 3366 | 0                | 2904  | 198             | 132            | 0                | 360 | 43.4 | 4.61 | 94  | 14.3 | 9.80   |      | 12 |
| 70   | 2   | 48  | 3500  | 2275 | 0                | 980   | 140             | 105            | 0                | 211 | 36.0 | 4.24 | 85  | 12.3 | 3.50   | 5.7  | 12 |
| 81   | 2   | 41  | 4200  | 2604 | 42               | 1302  | 126             | 126            | 0                | 406 | 38.7 | 4.31 | 90  | 13.0 | 5.30   | 10.4 | 6  |
| 84   | 1   | 30  | 4800  | 2064 | 192              | 1776  | 192             | 676            | 0                | 199 | 50.0 | 5.28 | 95  | 15.0 | 3.00   |      |    |
| 2102 | 1   | 42  | 8400  | 4536 | 0                | 3276  | 504             | 0              | 84               | 380 | 48.5 | 4.92 | 99  | 16.8 | 1.60   |      |    |
| 2103 | 1   | 75  | 9700  | 6402 | 291              | 2425  | 388             | 194            | 0                | 281 | 43.7 | 4.48 | 98  | 13.8 | 3.90   |      |    |
| 2104 | 2   | 55  |       |      |                  |       |                 |                |                  |     |      |      |     |      | 6.40   |      |    |
| 2105 | 1   | 77  | 11500 | 7360 | 0                | 2990  | 345             | 230            | 0                | 310 | 41.2 | 4.58 | 90  | 13.1 | 3.90   |      |    |
| 2106 | 1   | 36  | 12600 | 5796 | 252              | 5418  | 756             | 378            | 0                | 313 | 49.8 | 5.79 | 86  | 16.9 |        |      |    |

| PID  | SEX | AGE | WBC   | PMN  | COMPUTER LISTING OF 1985 RAW DATA |       |      |      |      |     |      |      |     |      | TSH   | PRL |
|------|-----|-----|-------|------|-----------------------------------|-------|------|------|------|-----|------|------|-----|------|-------|-----|
|      |     |     |       |      | BAND                              | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  |       |     |
| 2107 | 2   | 57  | 12800 | 7296 | 768                               | 3968  | 384  | 384  | 0    | 202 | 42.9 | 4.77 | 90  | 13.7 | 1.30  |     |
| 2108 | 1   | 43  | 7200  | 4032 | 144                               | 2808  | 0    | 216  | 0    | 333 | 43.3 | 4.81 | 90  | 15.1 | 1.30  |     |
| 2110 | 1   | 79  | 7800  | 4680 | 166                               | 2262  | 312  | 390  | 0    | 244 | 39.9 | 3.97 | 101 | 12.8 | 5.40  |     |
| 2111 | 2   | 36  | 8900  | 6340 | 0                                 | 2670  | 446  | 446  | 0    | 361 | 39.8 | 4.87 | 82  | 13.1 | 3.60  |     |
| 2113 | 2   | 36  | 8200  | 5248 | 0                                 | 2214  | 410  | 328  | 0    | 346 | 38.9 | 4.90 | 79  | 13.6 | 4.00  |     |
| 2114 | 1   | 72  | 6400  | 3776 | 266                               | 2048  | 128  | 192  | 0    | 321 | 48.3 | 6.41 | 89  | 13.9 | 3.90  |     |
| 2116 | 1   | 31  | 8600  |      |                                   |       |      |      |      |     | 44.7 | 5.20 | 86  | 14.6 |       |     |
| 2117 | 2   | 66  | 8600  | 4760 | 86                                | 2976  | 426  | 256  | 0    | 360 | 37.7 | 4.04 | 93  | 13.6 |       |     |
| 2119 | 2   | 50  | 8400  | 3948 | 84                                | 3696  | 420  | 252  | 0    | 238 | 40.4 | 4.66 | 89  | 13.4 | 2.80  |     |
| 2123 | 1   | 46  | 6000  | 3600 | 60                                | 2160  | 120  | 0    | 0    | 204 | 47.1 | 4.88 | 97  | 16.6 | 3.20  |     |
| 2124 | 1   | 32  | 8800  | 4664 | 88                                | 3344  | 616  | 88   | 0    | 384 | 48.8 | 5.36 | 91  | 16.0 | 3.20  |     |
| 2126 | 1   | 68  | 6700  | 3283 | 0                                 | 3149  | 134  | 134  | 0    | 280 | 47.1 | 4.84 | 97  | 16.1 | 4.10  |     |
| 2126 | 2   | 40  | 6200  | 3634 | 62                                | 2046  | 372  | 62   | 0    | 280 | 41.2 | 4.61 | 91  | 13.1 | 3.10  |     |
| 2129 | 2   | 49  | 8000  | 4160 | 80                                | 2320  | 560  | 880  | 0    | 421 | 40.7 | 5.00 | 81  | 13.2 | 4.10  |     |
| 2130 | 2   | 34  | 6100  | 4392 | 61                                | 1281  | 244  | 122  | 0    | 204 | 34.8 | 3.68 | 89  | 11.4 | 6.00  |     |
| 2134 | 2   | 32  | 8700  | 1740 | 87                                | 5668  | 348  | 522  | 0    | 308 | 39.3 | 3.90 | 90  | 12.3 | 3.40  |     |
| 2136 | 1   | 36  | 8200  | 4182 | 0                                 | 2642  | 328  | 492  | 82   | 236 | 46.4 | 4.86 | 96  | 14.3 | 4.30  |     |
| 2137 | 1   | 47  | 6000  | 3300 | 0                                 | 2280  | 120  | 300  | 0    | 238 | 46.9 | 5.11 | 90  | 14.4 | 3.60  |     |
| 2138 | 2   | 36  | 10500 | 6616 | 0                                 | 2206  | 210  | 1470 | 0    | 468 | 40.4 | 4.61 | 88  | 12.6 | 3.20  |     |
| 2139 | 2   | 67  | 6600  | 3380 | 66                                | 2406  | 260  | 390  | 0    | 304 | 37.9 | 4.01 | 96  | 12.2 | 6.20  |     |
| 2140 | 2   | 78  | 6400  | 4096 | 0                                 | 1792  | 320  | 0    | 0    | 214 | 40.1 | 4.17 | 96  | 12.8 | 6.60  |     |
| 2142 | 1   | 37  | 11200 | 7168 | 112                               | 3472  | 112  | 336  | 0    | 209 | 61.6 | 3.20 | 97  | 16.4 | 4.20  |     |
| 2143 | 1   | 34  | 6400  | 3328 | 0                                 | 2304  | 384  | 384  | 0    | 408 | 41.0 | 4.77 | 86  | 12.6 | 7.40  |     |
| 2146 | 1   | 64  | 6100  | 2928 | 163                               | 2601  | 244  | 244  | 0    | 287 | 41.8 | 4.30 | 91  | 13.7 | 6.40  |     |
| 2147 | 2   | 37  | 6300  | 1802 | 63                                | 3180  | 169  | 106  | 0    | 366 | 41.7 | 4.69 | 89  | 14.7 | 2.40  |     |
| 2148 | 1   | 76  | 9600  | 6226 | 360                               | 3420  | 286  | 190  | 0    | 244 | 42.3 | 4.46 | 96  | 13.7 | 4.70  |     |
| 2149 | 2   | 40  | 6800  | 3016 | 0                                 | 2436  | 290  | 68   | 0    | 268 | 38.2 | 4.33 | 88  | 11.4 | 4.40  |     |
| 2150 | 1   | 44  | 9300  | 5580 | 186                               | 2883  | 186  | 466  | 0    | 206 | 49.8 | 5.84 | 86  | 16.2 | 4.60  |     |
| 2162 | 1   | 49  | 6600  | 3080 | 66                                | 1660  | 330  | 220  | 66   | 266 | 43.8 | 4.69 | 93  | 14.7 | 2.90  |     |
| 2163 | 1   | 34  | 4900  | 3479 | 49                                | 1078  | 147  | 147  | 0    | 266 | 46.4 | 5.61 | 84  | 13.2 |       |     |
| 2166 | 1   | 32  | 6200  | 2366 | 0                                 | 3162  | 372  | 310  | 0    | 264 | 46.7 | 5.78 | 84  | 16.1 | 3.60  |     |
| 2166 | 1   | 40  | 6400  | 3904 | 0                                 | 2048  | 320  | 128  | 0    | 272 | 46.4 | 4.96 | 92  | 14.6 | 3.00  |     |
| 2168 | 2   | 61  | 7000  | 4830 | 0                                 | 1610  | 420  | 140  | 0    | 279 | 39.6 | 4.31 | 92  | 13.0 | 4.10  |     |
| 2169 | 2   | 37  | 8100  | 5427 | 243                               | 2106  | 324  | 81   | 0    | 394 | 43.1 | 4.67 | 92  | 13.8 | 4.70  |     |
| 2180 | 2   | 36  | 8000  | 6200 | 320                               | 1440  | 480  | 660  | 0    | 296 | 46.0 | 4.79 | 94  | 14.0 | 6.00  |     |
| 2182 | 2   | 64  | 7400  | 4614 | 148                               | 2220  | 296  | 222  | 0    | 399 | 36.6 | 4.02 | 89  | 11.4 | 6.30  |     |
| 2186 | 1   | 43  | 7800  | 3666 | 78                                | 3668  | 312  | 166  | 0    | 229 | 43.6 | 4.94 | 88  | 14.6 | 3.40  |     |
| 2186 | 1   | 69  | 7800  | 3666 | 78                                | 2964  | 468  | 646  | 78   | 268 | 46.6 | 4.74 | 98  | 13.9 | 6.60  |     |
| 2187 | 1   | 46  | 7800  | 3744 | 312                               | 3198  | 468  | 78   | 0    | 211 | 46.9 | 5.32 | 88  | 16.3 | 3.20  |     |
| 2171 | 2   | 34  | 8600  | 5016 | 426                               | 2210  | 170  | 696  | 86   | 280 | 41.2 | 4.60 | 90  | 13.0 | 2.80  |     |
| 2172 | 2   | 44  | 7100  | 6041 | 142                               | 1633  | 142  | 142  | 0    | 336 | 37.4 | 4.06 | 92  | 12.6 | 3.30  |     |
| 2174 | 1   | 32  | 8800  | 6336 | 0                                 | 1672  | 440  | 264  | 88   | 288 | 61.6 | 6.76 | 89  | 16.9 | 4.40  |     |
| 2176 | 1   | 42  | 6800  | 3128 | 68                                | 3400  | 204  | 0    | 0    | 233 | 44.9 | 4.66 | 96  | 14.6 | 4.80  |     |
| 2179 | 1   | 34  | 8100  | 4860 | 0                                 | 2673  | 406  | 162  | 0    | 223 | 61.0 | 6.28 | 81  | 16.8 | 3.00  |     |
| 2182 | 2   | 84  | 4600  | 1794 | 0                                 | 2676  | 138  | 92   | 0    | 372 | 34.8 | 3.74 | 93  | 11.6 | 4.60  |     |
| 2188 | 1   | 34  | 8800  | 4400 | 176                               | 2816  | 880  | 440  | 88   | 181 | 54.7 | 6.91 | 93  | 16.6 | 4.30  |     |
| 2189 | 2   | 69  | 8400  | 6662 | 168                               | 766   | 336  | 604  | 84   | 216 | 31.7 | 3.46 | 92  | 10.3 | 3.70  |     |
| 2193 | 2   | 63  | 6900  | 4130 | 296                               | 1476  | 0    | 0    | 0    | 300 | 40.1 | 4.30 | 93  | 13.0 | 4.80  |     |
| 2196 | 2   | 66  | 6700  | 3484 | 67                                | 2747  | 201  | 67   | 0    | 388 | 40.0 | 4.86 | 82  | 13.4 | 4.70  |     |
| 2196 | 2   | 70  | 6600  | 2860 | 66                                | 3186  | 326  | 66   | 0    | 204 | 41.6 | 4.70 | 88  | 13.2 | 27.00 |     |
| 2197 | 2   | 33  | 6300  | 3160 | 63                                | 2467  | 262  | 316  | 63   | 171 | 33.1 | 3.73 | 89  | 10.9 | 4.70  |     |
| 2200 | 2   | 74  | 6200  |      |                                   |       |      |      |      |     | 36.6 | 3.76 | 94  | 11.6 |       |     |
| 2206 | 1   | 61  | 9200  | 4784 | 92                                | 3680  | 460  | 184  | 0    | 291 | 43.7 | 4.96 | 88  | 13.7 | 3.90  |     |
| 2206 | 1   | 64  | 9200  | 4608 | 184                               | 3966  | 276  | 184  | 92   | 240 | 47.0 | 5.13 | 92  | 14.6 | 2.40  |     |
| 2207 | 1   | 37  | 10100 | 6969 | 404                               | 3232  | 303  | 101  | 101  | 309 | 47.6 | 5.60 | 85  | 14.9 | 3.30  |     |

| PID  | SEX | AGE | WBC   | PMN   | COMPUTER<br>BAND | LYMPH | LISTING<br>MONO | OF 1986 RAW DATA<br>EOS | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH    | PRL | T4 |
|------|-----|-----|-------|-------|------------------|-------|-----------------|-------------------------|------|-----|------|------|-----|------|--------|-----|----|
| 2208 | 2   | 69  | 9600  | 5952  | 768              | 2016  | 384             | 480                     | 0    | 300 | 40.2 | 4.37 | 92  | 13.5 | 4.10   |     |    |
| 2209 | 2   | 37  | 8400  | 5964  | 0                | 1848  | 504             | 84                      | 0    | 344 | 40.1 | 4.31 | 93  | 12.3 | 3.80   |     |    |
| 2210 | 2   | 32  | 8400  | 3712  | 64               | 2240  | 192             | 512                     | 0    | 213 | 44.8 | 4.98 | 90  | 13.7 | 3.50   |     |    |
| 2212 | 2   | 66  | 7200  | 3960  | 216              | 2820  | 144             | 360                     | 0    | 211 | 39.3 | 4.23 | 92  | 12.6 | 9.80   |     |    |
| 2213 | 2   | 33  | 5300  | 3869  | 53               | 424   | 212             | 212                     | 0    | 275 | 35.9 | 4.19 | 86  | 11.5 | 1.90   |     |    |
| 2215 | 2   | 66  | 9400  | 5452  | 470              | 2914  | 282             | 282                     | 0    | 442 | 43.7 | 5.09 | 86  | 14.1 | 2.30   |     |    |
| 2217 | 2   | 53  | 7400  | 4440  | 74               | 2220  | 296             | 370                     | 0    | 220 | 39.0 | 3.92 | 99  | 12.8 | 4.30   |     |    |
| 2218 | 2   | 31  | 7500  | 4200  | 75               | 2700  | 450             | 75                      | 0    | 242 | 39.1 | 4.30 | 91  | 12.7 | 5.90   |     |    |
| 2220 | 2   | 57  | 6700  | 3886  | 134              | 2010  | 335             | 335                     | 0    | 280 | 39.0 | 4.16 | 94  | 13.0 | 6.00   |     |    |
| 2221 | 2   | 84  | 14900 | 10430 | 1192             | 2682  | 447             | 0                       | 149  | 232 | 39.6 | 4.30 | 92  | 12.8 | 5.50   |     |    |
| 2224 | 2   | 63  | 8200  | 5084  | 656              | 2050  | 246             | 164                     | 0    | 329 | 38.0 | 3.97 | 96  | 11.9 | 3.80   |     |    |
| 2225 | 2   | 38  | 8400  | 3192  | 252              | 4704  | 84              | 168                     | 0    | 220 | 37.5 | 4.30 | 87  | 12.3 | 5.40   |     |    |
| 2226 | 2   | 33  | 5500  | 3410  | 110              | 1870  | 110             | 0                       | 0    | 263 | 37.9 | 4.68 | 81  | 12.3 | 141.00 |     |    |
| 2227 | 2   | 36  | 6600  | 3036  | 198              | 2574  | 396             | 396                     | 0    | 424 | 39.9 | 5.39 | 74  | 10.6 | 3.70   |     |    |
| 2228 | 2   | 40  | 14200 | 8236  | 668              | 3560  | 994             | 852                     | 0    | 310 | 39.4 | 4.34 | 91  | 12.6 | 3.70   |     |    |
| 2229 | 2   | 50  | 7800  | 5226  | 156              | 2184  | 312             | 312                     | 0    | 244 | 46.2 | 4.94 | 94  | 11.3 | 3.20   |     |    |
| 2230 | 2   | 44  | 8000  | 5896  | 0                | 1936  | 616             | 264                     | 0    | 355 | 45.3 | 5.22 | 87  | 14.8 |        |     |    |
| 2231 | 2   | 33  | 7700  | 4312  | 154              | 2618  | 462             | 154                     | 0    | 349 | 42.6 | 4.89 | 87  | 13.7 | 3.50   |     |    |
| 2232 | 1   | 34  | 8200  | 4510  | 82               | 2870  | 410             | 328                     | 0    | 250 | 52.4 | 5.47 | 96  | 17.1 | 7.50   |     |    |
| 2233 | 1   | 33  | 7000  | 3570  | 0                | 2310  | 700             | 420                     | 0    | 265 | 49.5 | 5.31 | 93  | 16.8 | 5.20   |     |    |
| 2234 | 1   | 45  | 12500 | 8375  | 0                | 3260  | 250             | 625                     | 0    | 288 | 54.5 | 6.03 | 90  | 15.3 | 4.80   |     |    |
| 2235 | 1   | 39  | 12800 | 6784  | 384              | 4608  | 512             | 512                     | 0    | 244 | 44.0 | 4.77 | 92  | 14.5 |        |     |    |
| 2236 | 1   | 43  | 6300  | 3213  | 0                | 2646  | 378             | 63                      | 0    | 267 | 44.0 | 5.11 | 86  | 14.6 | 11.30  |     |    |
| 2239 | 2   | 35  | 8000  | 5600  | 0                | 1680  | 240             | 480                     | 0    | 355 | 32.8 | 3.65 | 90  | 11.5 | 1.00   |     |    |
| 2242 | 1   | 32  | 9300  | 7719  | 279              | 930   | 93              | 0                       | 0    | 253 | 40.2 | 4.52 | 89  | 13.5 | 2.90   |     |    |
| 2244 | 2   | 76  | 7000  | 3920  | 210              | 2730  | 140             | 0                       | 0    | 339 | 35.9 | 3.84 | 93  | 11.6 | 3.50   |     |    |
| 2245 | 1   | 32  | 8900  | 6319  | 178              | 1691  | 534             | 178                     | 0    | 268 | 44.8 | 4.69 | 96  | 14.6 | 4.50   |     |    |
| 2247 | 2   | 40  | 8400  | 4872  | 336              | 2268  | 504             | 420                     | 0    | 332 | 36.1 | 4.26 | 85  | 11.4 | 2.50   |     |    |
| 2248 | 2   | 47  | 9800  | 7154  | 490              | 1176  | 588             | 294                     | 98   | 275 | 42.8 | 4.91 | 81  | 13.4 | 2.90   |     |    |
| 2250 | 1   | 42  | 8400  | 5376  | 84               | 2436  | 84              | 420                     | 0    | 277 | 49.3 | 5.54 | 89  | 15.9 | 2.90   |     |    |
| 2251 | 2   | 37  | 8900  | 4183  | 0                | 4628  | 89              | 0                       | 0    | 294 | 37.8 | 4.92 | 77  | 12.2 | 4.90   |     |    |
| 2254 | 2   | 36  | 6200  | 3658  | 248              | 1674  | 124             | 496                     | 0    | 208 | 29.8 | 3.55 | 84  | 9.7  | 9.40   |     |    |
| 2255 | 2   | 31  | 8300  | 3652  | 166              | 3154  | 249             | 1079                    | 0    | 264 | 43.6 | 4.89 | 89  | 13.5 | 5.00   |     |    |
| 2256 | 2   | 37  | 8500  | 4678  | 340              | 3400  | 85              | 0                       | 0    | 391 | 40.8 | 4.61 | 89  | 13.7 | 3.20   |     |    |
| 2257 | 1   | 39  | 6200  | 3844  | 248              | 1736  | 310             | 62                      | 0    | 252 | 43.4 | 5.21 | 83  | 14.2 | 4.90   |     |    |
| 2260 | 2   | 32  | 8100  | 3321  | 81               | 4212  | 243             | 243                     | 0    | 252 | 42.3 | 4.86 | 87  | 14.4 | 2.60   |     |    |
| 2261 | 1   | 57  | 6500  | 3706  | 260              | 2080  | 195             | 195                     | 65   | 204 | 48.3 | 5.02 | 96  | 15.5 | 4.70   |     |    |
| 2269 | 1   | 31  | 11300 | 7684  | 226              | 2938  | 226             | 226                     | 0    | 228 | 48.3 | 5.11 | 95  | 16.3 | 4.00   |     |    |
| 2271 | 1   | 31  | 6800  | 3400  | 68               | 2856  | 272             | 204                     | 0    | 361 | 45.8 | 5.14 | 89  | 15.7 | 4.80   |     |    |
| 2274 | 1   | 31  | 6900  | 3174  | 138              | 3312  | 69              | 207                     | 0    | 338 | 44.8 | 5.12 | 88  | 14.3 | 5.00   |     |    |
| 2277 | 2   | 33  | 6200  | 3348  | 124              | 2232  | 372             | 62                      | 0    | 222 | 30.0 | 4.99 | 60  | 8.4  | 5.30   |     |    |
| 805  | 2   | 32  | 6400  | 2368  | 0                | 3328  | 192             | 448                     | 64   | 359 | 44.7 | 5.16 | 87  | 12.8 |        |     |    |
| 811  | 2   | 33  | 9100  | 4095  | 182              | 3913  | 182             | 637                     | 91   | 288 | 44.0 | 4.56 | 98  | 13.3 |        |     |    |
| 815  | 1   | 37  | 6100  | 2806  | 0                | 2040  | 102             | 163                     | 0    | 150 | 43.1 | 5.02 | 86  | 15.9 |        |     |    |
| 816  | 2   | 36  | 7200  | 3312  | 144              | 2592  | 216             | 936                     | 0    | 259 | 38.6 | 4.48 | 86  | 12.4 |        |     |    |
| 818  | 1   | 36  | 6100  | 3721  | 0                | 2013  | 244             | 122                     | 0    | 411 | 52.2 | 5.57 | 94  | 15.1 |        |     |    |
| 821  | 2   | 38  | 6900  | 4140  | 0                | 2277  | 276             | 207                     | 0    | 288 | 35.0 | 3.96 | 88  | 11.2 |        |     |    |
| 822  | 1   | 41  | 8200  | 4018  | 164              | 2952  | 410             | 574                     | 82   | 241 | 44.8 | 5.10 | 88  | 14.8 |        |     |    |
| 823  | 1   | 42  | 5500  | 3025  | 55               | 1595  | 220             | 550                     | 55   | 240 | 46.5 | 4.65 | 100 | 15.3 |        |     |    |
| 825  | 2   | 43  | 6300  | 2961  | 126              | 2646  | 252             | 252                     | 63   | 305 | 40.7 | 4.67 | 87  | 13.1 |        |     |    |
| 826  | 2   | 49  | 5700  | 3648  | 285              | 1197  | 285             | 285                     | 0    | 224 | 40.9 | 4.45 | 92  | 12.1 |        |     |    |
| 827  | 1   | 45  | 8400  | 5292  | 168              | 2100  | 336             | 420                     | 84   | 325 | 46.0 | 4.89 | 94  | 15.3 |        |     |    |
| 829  | 2   | 48  | 4300  | 2193  | 0                | 1677  | 258             | 172                     | 0    | 280 | 41.2 | 4.37 | 94  | 12.2 |        |     |    |
| 830  | 1   | 47  | 5200  | 2704  | 0                | 2028  | 260             | 208                     | 0    | 284 | 46.6 | 4.95 | 94  | 14.8 |        |     |    |
| 831  | 1   | 45  | 6000  | 1980  | 120              | 3540  | 120             | 240                     | 0    | 262 | 52.5 | 5.62 | 93  | 15.8 |        |     |    |

| PID | SEX | AGE | WBC   | PMN  | BAND | LYMPH | MONO | EOS | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH  | PRL |
|-----|-----|-----|-------|------|------|-------|------|-----|------|-----|------|------|-----|------|------|-----|
| 832 | 2   | 48  | 6500  | 3315 | 0    | 2730  | 130  | 325 | 0    | 251 | 36.7 | 4.52 | 81  | 12.2 |      |     |
| 833 | 1   | 53  | 4100  | 1927 | 0    | 1845  | 82   | 41  | 0    | 164 | 42.3 | 4.90 | 86  | 13.4 |      |     |
| 834 | 1   | 52  | 7500  | 3376 | 75   | 3750  | 300  | 0   | 0    | 299 | 49.1 | 5.47 | 90  | 15.8 |      |     |
| 835 | 2   | 52  | 10600 | 5618 | 106  | 4240  | 424  | 106 | 0    | 280 | 42.5 | 4.46 | 95  | 14.5 |      |     |
| 838 | 1   | 54  | 8800  | 4752 | 176  | 3344  | 352  | 176 | 0    | 249 | 53.3 | 5.45 | 98  | 16.1 |      |     |
| 839 | 2   | 59  | 7800  | 2262 | 78   | 4758  | 546  | 156 | 0    | 321 | 47.1 | 4.96 | 95  | 14.2 |      |     |
| 840 | 1   | 56  | 10900 | 4578 | 218  | 5450  | 545  | 109 | 0    | 366 | 45.9 | 5.82 | 79  | 14.9 |      |     |
| 841 | 2   | 53  | 8400  | 4956 | 84   | 2184  | 420  | 756 | 0    | 252 | 43.1 | 4.49 | 96  | 13.2 |      |     |
| 842 | 1   | 61  | 6800  | 2924 | 136  | 3468  | 136  | 136 | 0    | 144 | 44.3 | 4.61 | 96  | 13.9 |      |     |
| 843 | 2   | 57  | 5600  | 2520 | 112  | 2520  | 112  | 336 | 0    | 323 | 39.0 | 4.03 | 97  | 12.7 |      |     |
| 844 | 2   | 57  | 7400  | 4588 | 74   | 2368  | 222  | 148 | 0    | 241 | 37.8 | 4.04 | 94  | 12.0 |      |     |
| 845 | 1   | 56  | 6700  | 2948 | 0    | 3082  | 469  | 201 | 0    | 217 | 42.0 | 4.66 | 90  | 13.2 |      |     |
| 846 | 2   | 63  | 3700  | 999  | 148  | 2405  | 111  | 37  | 0    | 232 | 34.6 | 3.64 | 95  | 11.6 |      |     |
| 851 | 2   | 76  | 5100  | 2856 | 51   | 1632  | 357  | 204 | 0    | 219 | 39.4 | 4.02 | 98  | 12.1 |      |     |
| 864 | 1   | 60  | 7600  | 3344 | 0    | 3724  | 228  | 228 | 0    | 227 | 43.2 | 4.81 | 90  | 13.9 |      |     |
| 865 | 2   | 52  | 9300  | 4743 | 279  | 3162  | 558  | 558 | 0    | 279 | 43.6 | 4.47 | 98  | 14.0 | 5.90 |     |
| 867 | 2   | 57  | 10800 | 4680 | 432  | 4860  | 216  | 432 | 0    | 335 | 44.8 | 5.00 | 90  | 15.2 | 2.50 |     |
| 868 | 1   | 62  | 4400  | 2080 |      | 1760  | 80   | 80  | 40   | 215 | 43.0 | 4.56 | 94  | 14.6 |      |     |
| 879 | 2   | 30  | 8500  | 5185 | 0    | 2690  | 340  | 85  | 0    | 308 | 49.6 | 5.47 | 91  | 12.8 |      |     |
| 880 | 1   | 83  | 12000 | 7800 | 600  | 2760  | 600  | 240 | 0    | 211 | 46.3 | 4.47 | 104 | 13.5 |      |     |
| 881 | 1   | 53  | 6800  | 3740 | 68   | 2584  | 408  | 0   | 0    | 228 | 46.6 | 5.14 | 91  | 14.7 |      |     |
| 882 | 1   | 52  | 6400  | 3776 | 0    | 2368  | 0    | 256 | 0    | 244 | 47.4 | 5.70 | 83  | 14.6 |      |     |
| 896 | 2   | 46  | 5800  | 3364 | 232  | 1972  | 232  | 0   | 0    | 251 | 40.7 | 4.57 | 89  | 13.6 |      |     |
| 911 | 2   | 33  | 5800  | 4002 | 174  | 1450  | 58   | 116 | 0    | 260 | 32.2 | 3.35 | 96  | 11.0 |      |     |
| 917 | 1   | 65  | 8000  | 5200 | 80   | 2400  | 240  | 80  | 0    | 224 | 36.5 | 4.27 | 85  | 11.7 | 5.20 |     |
| 919 | 1   | 38  | 5300  | 2385 | 53   | 2438  | 212  | 212 | 0    | 375 | 35.7 | 4.19 | 85  | 12.0 |      |     |
| 920 | 1   | 54  | 5300  | 2014 | 159  | 2544  | 212  | 371 | 0    | 191 | 48.0 | 4.97 | 97  | 14.8 |      |     |
| 922 | 2   | 62  | 5700  | 2223 | 57   | 2907  | 171  | 342 | 0    | 200 | 43.3 | 4.60 | 94  | 13.4 |      |     |
| 925 | 2   | 36  | 9500  | 5985 | 285  | 2090  | 665  | 475 | 0    | 288 | 38.6 | 4.49 | 86  | 12.5 |      |     |
| 928 | 2   | 73  | 6200  | 3038 | 310  | 1922  | 248  | 662 | 0    | 196 | 32.4 | 3.31 | 98  | 10.3 |      | </  |

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| PID  | SEX | AGE | COMPUTER LISTING OF 1985 RAW DATA |      |      |       |      |     |      |     |      |      |     | TSH  | PRL  | T4 |
|------|-----|-----|-----------------------------------|------|------|-------|------|-----|------|-----|------|------|-----|------|------|----|
|      |     |     | WBC                               | PMN  | BAND | LYMPH | MONO | EOS | BASO | PLT | HCT  | RBC  | MCV | HGB  |      |    |
| 1035 | 2   | 34  | 8000                              | 4000 | 80   | 3440  | 480  | 0   | 0    | 425 | 42.7 | 4.74 | 90  | 14.8 |      |    |
| 1043 | 2   | 50  | 5300                              |      |      |       |      |     |      | 158 | 44.6 | 5.23 | 85  | 11.9 |      |    |
| 1500 | 1   | 55  | 6700                              | 3819 | 134  | 2211  | 402  | 134 | 0    | 250 | 36.3 | 3.98 | 91  | 11.7 |      |    |
| 1505 | 2   | 46  |                                   |      |      |       |      |     |      |     |      |      |     |      | 3.20 |    |
| 1519 | 1   | 43  | 7700                              | 4312 | 154  | 2695  | 462  | 77  | 0    | 226 | 52.2 | 5.49 | 95  | 16.2 |      |    |
| 1520 | 2   | 55  | 7200                              | 4392 | 144  | 2232  | 360  | 72  | 0    | 324 | 44.0 | 5.11 | 86  | 14.6 |      |    |
| 1530 | 2   | 39  | 3900                              | 2067 | 117  | 1092  | 78   | 546 | 0    | 140 | 40.8 | 4.58 | 89  | 13.8 |      |    |
| 1541 | 2   | 58  | 5800                              | 2900 | 0    | 2282  | 348  | 290 | 0    | 172 | 39.3 | 4.27 | 92  | 13.1 |      |    |
| 1542 | 2   | 33  | 8400                              | 3024 | 252  | 4452  | 420  | 252 | 0    | 256 | 46.6 | 5.80 | 80  | 16.6 |      |    |
| 1546 | 1   | 72  | 6500                              | 3185 | 65   | 3250  | 0    | 0   | 0    | 162 | 61.1 | 6.41 | 95  | 15.8 |      |    |
| 1548 | 2   | 44  | 12700                             | 7493 | 381  | 3937  | 254  | 635 | 0    | 328 | 38.1 | 4.16 | 92  | 13.2 |      |    |
| 1549 | 1   | 32  | 6800                              | 2992 | 68   | 3196  | 476  | 68  | 0    | 264 | 44.6 | 4.88 | 91  | 14.7 |      |    |
| 1552 | 1   | 56  | 7100                              | 4970 | 71   | 1775  | 284  | 0   | 0    | 300 | 43.1 | 4.77 | 90  | 14.3 |      |    |
| 1553 | 1   | 34  | 5400                              | 2970 | 54   | 1836  | 216  | 54  | 0    | 268 | 45.6 | 4.76 | 96  | 16.0 |      |    |
| 1555 | 2   | 43  | 8100                              |      |      |       |      |     |      |     | 41.6 | 5.85 | 81  | 15.7 |      |    |
| 1556 | 2   | 41  | 5200                              | 3640 | 38   | 1824  | 52   | 114 | 0    | 253 | 44.8 | 4.34 | 99  | 12.8 |      |    |
| 1558 | 2   | 36  | 8000                              | 4080 | 480  | 2960  | 400  | 160 | 0    | 351 | 35.9 | 4.33 | 83  | 12.2 | 4.20 |    |
| 1559 | 2   | 33  | 8600                              | 3440 | 0    | 3870  | 516  | 774 | 0    | 252 | 42.4 | 5.22 | 81  | 12.8 |      |    |
| 1560 | 2   | 63  | 9200                              | 3220 | 184  | 6060  | 92   | 644 | 0    | 205 | 44.6 | 4.61 | 97  | 14.8 |      |    |
| 1561 | 2   | 69  | 6700                              | 2747 | 0    | 3082  | 134  | 670 | 67   | 360 | 39.1 | 4.01 | 98  | 13.0 |      |    |
| 1563 | 1   | 50  | 7000                              | 3780 | 0    | 2660  | 420  | 140 | 0    | 254 | 45.5 | 4.73 | 96  | 14.8 |      |    |
| 1564 | 2   | 37  | 6900                              | 3450 | 0    | 3105  | 276  | 69  | 0    | 227 | 41.2 | 4.67 | 88  | 13.4 | 2.70 |    |
| 1569 | 2   | 31  | 6800                              | 3740 | 0    | 2516  | 408  | 136 | 0    | 206 | 38.6 | 4.26 | 91  | 13.2 |      |    |
| 1570 | 2   | 65  | 8500                              | 3995 | 0    | 3825  | 510  | 170 | 0    | 322 | 43.0 | 4.88 | 88  | 14.3 |      |    |
| 1572 | 1   | 38  | 5200                              | 2756 | 52   | 2132  | 104  | 166 | 0    | 214 | 49.5 | 5.46 | 91  | 16.3 |      |    |
| 1573 | 1   | 36  | 8800                              | 4752 | 88   | 3520  | 88   | 352 | 0    |     | 49.6 | 5.23 | 95  | 16.6 | 3.00 |    |
| 1577 | 2   | 35  | 9600                              | 4896 | 96   | 3840  | 480  | 288 | 0    | 307 | 38.7 | 4.21 | 92  | 13.3 |      |    |
| 1578 | 2   | 51  | 9300                              | 6046 | 279  | 2325  | 558  | 93  | 0    | 362 | 46.2 | 5.39 | 86  | 14.6 |      |    |

| COMPUTER LISTING OF 1986 RAW DATA |     |     |       |       |      |       |      |      |      |     |      |      |     |      |        |      |      |     |      |      |     |      |
|-----------------------------------|-----|-----|-------|-------|------|-------|------|------|------|-----|------|------|-----|------|--------|------|------|-----|------|------|-----|------|
| PID                               | SEX | AGE | WBC   | PMN   | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH    | PRL  | T4   | TPR | ALB  | GLOB | A/G | CAL  |
| 2                                 | 1   | 34  | 8400  | 2680  | 64   | 3264  | 128  | 384  | 0    | 258 | 45.0 | 4.89 | 98  | 14.8 | 0.00   |      |      | 8.2 | 4.20 | 4.0  | 1.0 | 10.2 |
| 3                                 | 1   | 34  | 11700 | 6889  | 234  | 3510  | 488  | 819  | 0    | 235 | 45.7 | 5.10 | 90  | 15.6 | 244.00 | 30.4 | 6.8  | 8.3 | 4.00 | 4.3  | .9  | 9.7  |
| 4                                 | 1   | 71  | 7600  | 3116  | 0    | 3876  | 304  | 304  | 0    | 300 | 48.8 | 4.99 | 92  | 15.8 | 4.20   |      |      | 8.1 | 4.10 | 4.0  | 1.0 | 8.8  |
| 5                                 | 1   | 34  | 6900  | 2419  | 0    | 2637  | 354  | 472  | 118  | 270 | 39.2 | 4.22 | 93  | 13.3 | 32.10  |      | 6.6  | 7.2 | 3.90 | 3.3  | 1.2 |      |
| 7                                 | 1   | 67  | 4300  | 1159  | 0    | 1849  | 258  | 258  | 258  | 200 | 40.3 | 4.40 | 92  | 13.6 | .20    |      | 7.5  | 8.1 | 3.30 | 4.8  | .7  | 9.5  |
| 9                                 | 1   | 53  | 6900  | 3381  | 0    | 3036  | 207  | 138  | 138  | 183 | 45.9 | 4.79 | 96  | 14.7 | 2.70   | 1.5  |      | 7.6 | 4.10 | 3.4  | 1.2 | 10.0 |
| 10                                | 1   | 56  | 6700  | 4221  | 67   | 1876  | 335  | 67   | 134  | 215 | 42.2 | 5.08 | 83  | 14.3 | 0.00   |      |      | 7.7 | 3.90 | 3.8  | 1.0 | 10.0 |
| 12                                | 2   | 49  | 8200  | 4920  | 0    | 2870  | 164  | 248  | 0    | 270 | 38.6 | 4.28 | 90  | 13.4 | 3.90   |      |      | 7.6 | 3.90 | 3.6  | 1.1 | 9.4  |
| 14                                | 2   | 57  | 6500  | 3055  | 0    | 2925  | 195  | 260  | 65   | 220 | 37.4 | 3.87 | 97  | 12.8 | 4.20   |      |      | 7.8 | 3.90 | 3.9  | 1.0 | 9.8  |
| 15                                | 2   | 40  | 11300 | 5763  | 113  | 4407  | 791  | 113  | 113  | 405 | 43.3 | 4.70 | 92  | 13.3 | .30    |      |      | 8.1 | 3.80 | 4.3  | .9  | 9.3  |
| 16                                | 1   | 72  | 6300  | 2756  | 0    | 2067  | 371  | 53   | 53   | 248 | 42.8 | 5.70 | 75  | 13.0 |        |      |      |     |      |      |     |      |
| 17                                | 2   | 36  | 8400  | 5628  | 84   | 1848  | 252  | 588  | 0    | 185 | 43.6 | 4.69 | 93  | 13.3 |        |      |      | 7.6 | 3.80 | 3.8  | 1.0 | 8.6  |
| 18                                | 2   | 54  | 7400  | 3478  | 0    | 3330  | 222  | 296  | 74   | 418 | 40.5 | 4.53 | 89  | 14.0 | 4.40   | 18.3 | 7.4  | 7.8 | 4.20 | 3.6  | 1.2 | 9.8  |
| 19                                | 1   | 38  | 4800  | 3120  |      | 1104  | 240  | 336  |      | 240 | 46.6 | 5.97 | 78  | 14.2 | 6.80   |      |      |     |      |      |     |      |
| 20                                | 1   | 39  | 13700 | 11508 | 0    | 1233  | 685  | 274  | 0    | 258 | 49.6 | 5.74 | 86  | 15.5 | 3.40   |      |      | 8.1 | 4.20 | 3.9  | 1.0 | 10.2 |
| 21                                | 2   | 35  | 6900  | 3933  | 0    | 2691  | 69   | 69   | 0    | 283 | 36.7 | 4.52 | 81  | 12.3 |        |      | 12.7 | 7.3 | 4.00 | 3.5  | 1.1 | 6.7  |
| 22                                | 2   | 48  | 6500  | 3185  | 0    | 2666  | 260  | 390  | 0    | 325 | 39.6 | 4.04 | 98  | 13.0 | 3.80   |      |      | 7.9 | 3.60 | 4.3  | .8  | 9.5  |
| 24                                | 2   | 46  | 5100  | 3519  | 51   | 1173  | 255  | 102  | 0    | 220 | 44.2 | 4.75 | 93  | 14.4 | 4.50   |      |      | 8.0 | 3.60 | 4.4  | .8  | 9.8  |
| 27                                | 1   | 59  | 10800 | 3888  | 0    | 6156  | 648  | 108  | 0    | 288 | 49.1 | 4.91 | 100 | 17.0 | .60    |      |      | 8.3 | 3.70 | 4.6  | .8  | 9.5  |
| 33                                | 2   | 34  | 8800  | 4312  | 88   | 3784  | 352  | 264  | 0    | 338 | 40.8 | 4.26 | 96  | 13.4 | 61.60  | 14.9 |      | 8.1 | 3.70 | 4.4  | .8  | 9.4  |
| 34                                | 2   | 77  | 6300  | 2394  |      | 3402  | 315  | 126  |      | 203 | 35.0 | 3.86 | 103 | 11.6 | 5.20   |      |      | 7.8 | 3.40 | 4.4  | .8  | 9.6  |
| 35                                | 1   | 45  | 4500  | 2790  | 0    | 1350  | 180  | 180  | 0    | 220 | 44.3 | 4.40 | 101 | 15.1 | 0.00   | 4.5  |      | 7.6 | 4.00 | 3.4  | 1.2 | 9.3  |
| 36                                | 1   | 40  | 7700  | 4158  | 0    | 3080  | 231  | 0    | 0    | 243 | 46.7 | 4.64 | 101 | 14.7 | 4.00   |      | 1.6  |     |      |      |     |      |
| 37                                | 1   | 53  | 5400  | 2592  | 54   | 2376  | 0    | 432  | 0    | 208 | 42.3 | 4.22 | 100 | 13.5 | 2.50   | 1.5  | 7.5  | 7.2 | 3.80 | 3.4  | 1.1 | 9.7  |
| 39                                | 2   | 47  | 6600  | 2640  | 0    | 2970  | 396  | 0    | 0    | 528 | 38.1 | 4.61 | 94  | 13.3 | 6.50   |      |      | 8.2 | 3.60 | 4.6  | .8  | 9.5  |
| 40                                | 1   | 62  | 6000  | 2820  | 0    | 2820  | 240  | 60   | 60   | 308 | 43.2 | 4.54 | 95  | 13.6 | 3.60   |      |      | 6.1 | 3.40 | 3.2  | 1.1 | 9.2  |
| 41                                | 1   | 74  | 8300  | 5561  | 0    | 2573  | 83   | 83   | 0    | 270 | 37.9 | 3.85 | 98  | 12.8 | 3.40   |      | 6.6  | 8.2 | 3.60 | 4.7  | .7  | 9.5  |
| 42                                | 2   | 36  | 8200  | 4510  | 0    | 3198  | 246  | 246  | 0    | 203 | 43.3 | 4.32 | 100 | 14.8 |        |      |      | 8.0 | 3.80 | 4.2  | .9  | 9.7  |
| 44                                | 1   | 37  | 6500  | 3900  | 0    | 1950  | 455  | 65   | 130  | 210 | 46.6 | 5.69 | 82  | 15.5 | 2.80   |      | 9.2  | 7.7 | 3.70 | 4.0  | .9  | 9.2  |
| 47                                | 1   | 41  | 6000  | 2940  | 0    | 2520  | 180  | 300  | 60   | 163 | 45.6 | 4.48 | 102 | 15.5 | 3.50   | 4.6  |      | 8.6 | 4.10 | 4.5  | .9  | 10.1 |
| 49                                | 2   | 49  | 5500  | 1485  | 0    | 3575  | 110  | 275  | 55   | 300 | 41.4 | 4.74 | 87  | 13.8 | 2.90   |      | 9.4  | 8.8 | 4.10 | 4.7  | .9  |      |
| 61                                | 2   | 41  | 8200  | 3690  | 0    | 3772  | 164  | 574  | 0    | 243 | 43.2 | 4.62 | 94  | 14.8 | 12.60  |      |      | 7.1 | 3.60 | 3.6  | 1.0 | 9.6  |
| 63                                | 2   | 68  | 7000  | 3010  | 0    | 3430  | 280  | 210  | 70   | 183 | 40.9 | 4.30 | 95  | 13.7 | 1.30   |      |      | 7.3 | 3.70 | 3.6  | 1.0 | 10.1 |
| 64                                | 2   | 63  | 4700  | 4002  |      | 2415  | 69   | 414  |      | 187 | 33.0 | 3.43 | 96  | 11.3 | .70    | 3.3  | 10.6 | 7.8 | 3.60 | 4.2  | .8  | 9.5  |
| 65                                | 2   | 34  | 4700  | 3431  |      | 846   | 262  | 47   | 94   | 313 | 22.7 | 2.46 | 92  | 7.9  | 45.80  |      | 7.7  | 7.3 | 3.20 | 4.1  | .8  | 8.6  |
| 66                                | 2   | 62  | 7000  | 2240  | 0    | 3990  | 210  | 490  | 70   | 235 | 38.7 | 4.17 | 93  | 12.9 | 9.50   |      | 9.6  | 7.6 | 3.60 | 4.0  | .9  | 9.1  |
| 67                                | 2   | 46  | 7200  | 3096  | 0    | 3168  | 504  | 144  | 144  | 365 | 39.4 | 4.34 | 91  | 13.6 |        |      |      | 7.5 | 3.80 | 3.7  | 1.0 | 9.4  |
| 71                                | 2   | 59  | 6600  | 3870  | 0    | 4300  | 86   | 344  | 0    | 213 | 38.2 | 4.03 | 95  | 13.5 | 4.00   |      |      | 8.2 | 3.70 | 4.5  | .8  | 9.1  |
| 72                                | 2   | 40  | 9700  | 5628  | 97   | 2910  | 388  | 582  | 97   | 380 | 37.5 | 3.91 | 96  | 11.8 | 16.60  |      |      | 7.8 | 3.20 | 4.6  |     | 10.1 |
| 73                                | 1   | 51  | 5900  | 2419  | 59   | 3009  | 413  | 0    | 0    | 238 | 45.8 | 4.95 | 93  | 14.7 | .40    | 4.2  | 15.3 | 7.7 | 4.00 | 3.7  | 1.1 | 9.4  |
| 74                                | 2   | 49  | 8100  | 3402  | 81   | 3078  | 405  | 1134 | 0    | 310 | 45.9 | 5.22 | 88  | 15.2 |        |      |      | 7.9 | 3.60 | 4.4  | .8  | 9.1  |
| 75                                | 2   | 44  | 13100 | 7860  | 131  | 3144  | 524  | 1834 | 131  | 298 | 40.5 | 4.43 | 91  | 13.8 | 11.60  |      |      | 8.3 | 3.80 | 4.5  | .8  | 9.5  |
| 76                                | 1   | 43  | 6000  | 2040  |      | 3240  | 240  | 480  | 0    | 186 | 45.1 | 4.64 | 97  | 14.8 | 4.40   | 3.3  |      |     |      |      |     |      |
| 77                                | 1   | 57  | 7600  | 4788  | 0    | 1824  | 760  | 228  | 0    | 258 | 47.6 | 5.26 | 90  | 15.1 | 4.80   |      |      | 8.0 | 3.40 | 4.6  | .7  | 10.0 |
| 78                                | 2   | 68  | 7400  | 3700  | 0    | 3404  | 148  | 74   | 0    | 405 | 40.9 | 3.96 | 103 | 13.9 | 6.40   |      |      | 8.1 | 4.00 | 4.1  | 1.0 |      |
| 79                                | 1   | 72  | 6300  | 4410  | 0    | 1449  | 315  | 63   | 63   | 178 | 49.4 | 5.20 | 95  | 15.5 | 2.70   |      | 9.8  | 7.4 | 3.80 | 3.6  | 1.0 | 8.9  |
| 85                                | 1   | 31  | 8600  | 4902  |      | 2838  | 516  | 344  |      | 238 | 46.5 | 4.95 | 94  | 15.5 | 2.00   |      |      |     |      |      |     |      |
| 86                                | 2   | 32  | 5500  | 3025  | 0    | 2090  | 220  | 110  | 55   | 275 | 33.7 | 4.10 | 82  | 10.9 | 3.90   |      |      | 7.6 | 3.90 | 3.7  | 1.1 |      |
| 8                                 | 1   | 34  | 5900  | 3245  | 0    | 2301  | 236  | 118  | 0    | 333 | 42.0 | 4.41 | 95  | 14.3 | 3.40   |      |      | 8.2 | 4.40 | 3.8  | 1.1 | 9.4  |
| 8                                 | 2   | 34  | 8200  | 3526  | 82   | 3854  | 164  | 492  | 82   | 280 | 40.9 | 4.40 | 93  | 13.5 | .10    | 24.5 |      | 7.8 | 3.80 | 4.0  | .9  | 9.8  |
| 45                                | 2   | 65  | 5400  | 2268  | 108  | 2322  | 324  | 324  | 0    | 315 | 36.0 | 3.88 | 93  | 12.2 |        |      |      | 7.7 | 3.60 | 4.2  | .8  | 9.9  |
| 48                                | 2   | 38  | 6400  | 3778  | 64   | 2048  | 320  | 64   | 128  | 215 | 41.1 | 4.17 | 99  | 13.3 | 3.80   |      |      | 7.2 | 3.60 | 3.7  | 1.0 | 9.2  |
| 53                                | 2   | 40  | 9400  | 4512  | 0    | 4324  | 420  | 0    | 94   | 373 | 43.9 | 4.88 | 90  | 14.9 | 9.20   | 16.2 |      | 7.8 | 3.60 | 4.2  | .9  | 9.8  |
| 70                                | 2   | 49  | 5400  | 2430  | 0    | 1998  | 270  | 648  | 54   | 230 | 39.2 | 4.51 | 87  | 13.0 |        |      |      | 8.3 | 4.00 | 4.3  | .9  | 9.8  |

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| COMPUTER LISTING OF 1986 RAW DATA |     |     |       |       |      |       |      |      |      |     |      |      |     |      |       |     |    |     |      |      |     |     |
|-----------------------------------|-----|-----|-------|-------|------|-------|------|------|------|-----|------|------|-----|------|-------|-----|----|-----|------|------|-----|-----|
| PID                               | SEX | AGE | WBC   | PMN   | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH   | PRL | T4 | TPR | ALB  | GLOB | A/G | CAL |
| 2102                              | 1   | 43  | 8900  | 3657  | 0    | 2622  | 483  | 69   | 69   | 320 | 50.8 | 5.25 | 97  | 16.0 |       |     |    | 7.3 | 4.00 | 3.3  | 1.2 |     |
| 2103                              | 1   | 76  | 6100  | 3172  | 305  | 1952  | 366  | 305  | 0    | 250 | 41.7 | 4.22 | 99  | 13.5 |       |     |    | 7.9 | 3.90 | 4.0  | .9  |     |
| 2104                              | 2   | 58  | 4800  | 1920  | 0    | 2400  | 336  | 96   | 48   | 298 | 38.1 | 3.93 | 97  | 12.3 | 6.40  |     |    | 8.0 | 4.60 | 3.4  | 1.4 |     |
| 2105                              | 1   | 78  | 8000  | 6592  |      | 2781  | 721  | 103  | 103  | 492 | 40.6 | 4.59 | 88  | 14.3 |       |     |    | 8.1 | 4.10 | 4.0  | 1.1 |     |
| 2106                              | 1   | 36  | 16700 | 10855 | 167  | 4175  | 1002 | 501  | 0    | 290 | 49.1 | 5.65 | 87  | 16.4 |       |     |    |     |      |      |     |     |
| 2107                              | 2   | 58  | 14400 | 7776  | 0    | 4896  | 1008 | 576  | 144  | 240 | 44.1 | 4.85 | 91  | 13.7 |       |     |    | 8.8 | 4.70 | 4.1  | 1.1 |     |
| 2108                              | 1   | 80  | 5900  | 3363  | 0    | 1888  | 354  | 295  | 0    | 348 | 37.9 | 3.63 | 104 | 12.3 |       |     |    | 7.8 | 3.90 | 3.9  | 1.0 |     |
| 2109                              | 2   | 36  | 10800 | 5184  | 216  | 3888  | 1080 | 324  | 108  | 503 | 44.5 | 5.27 | 84  | 14.7 |       |     |    | 9.4 | 4.50 | 4.9  | .9  |     |
| 2110                              | 2   | 37  | 8000  | 3480  | 60   | 1600  | 240  | 360  | 60   | 363 | 41.9 | 5.12 | 82  | 13.1 |       |     |    | 7.5 | 3.90 | 3.6  | 1.1 |     |
| 2111                              | 1   | 73  | 6400  | 3840  | 128  | 1792  | 320  | 256  | 0    | 256 | 46.9 | 5.39 | 87  | 14.4 |       |     |    | 8.3 | 4.00 | 4.3  | .9  |     |
| 2112                              | 2   | 57  | 9100  | 5187  | 0    | 2912  | 364  | 637  | 0    | 310 | 49.0 | 5.16 | 96  | 14.7 |       |     |    | 8.5 | 4.20 | 4.3  | 1.0 |     |
| 2113                              | 2   | 51  | 6300  | 3465  | 0    | 2142  | 252  | 378  | 63   | 258 | 43.8 | 4.84 | 90  | 14.1 |       |     |    | 8.1 | 4.10 |      | 1.0 |     |
| 2123                              | 1   | 46  | 7200  | 5112  | 0    | 1512  | 288  | 288  | 0    | 223 | 45.6 | 4.62 | 99  | 14.4 |       |     |    | 8.2 | 4.10 | 4.1  | 1.0 |     |
| 2125                              | 1   | 68  | 5400  | 2754  | 0    | 1728  | 594  | 216  | 108  | 266 | 45.0 | 4.72 | 95  | 15.2 | 3.00  |     |    |     |      |      |     |     |
| 2126                              | 2   | 41  | 7300  | 3723  | 0    | 3066  | 146  | 292  | 73   | 318 | 39.9 | 4.44 | 90  | 13.2 |       |     |    | 7.6 | 4.20 | 3.4  | 1.2 |     |
| 2129                              | 2   | 50  | 6700  | 2144  | 67   | 3015  | 670  | 804  | 0    | 365 | 40.6 | 5.06 | 80  | 13.4 |       |     |    |     |      |      |     |     |
| 2130                              | 2   | 35  | 9300  | 3534  | 0    | 2883  | 651  | 2232 | 0    | 208 | 36.7 | 4.09 | 90  | 12.1 |       |     |    | 8.4 | 4.10 | 4.3  | 1.0 |     |
| 2132                              | 2   | 33  | 4500  | 2745  | 45   | 1215  | 135  | 360  | 0    | 273 | 42.4 | 4.94 | 86  | 13.3 |       |     |    |     |      |      |     |     |
| 2134                              | 2   | 33  | 8300  | 5229  | 83   | 2490  | 166  | 332  | 0    | 318 | 41.5 | 4.64 | 89  | 13.7 |       |     |    | 7.6 | 3.70 | 3.9  | .9  |     |
| 2136                              | 1   | 37  | 7200  | 3516  | 0    | 2592  | 432  | 360  | 0    | 308 | 47.4 | 4.89 | 97  | 15.0 |       |     |    | 7.0 | 3.90 | 3.1  | 1.2 |     |
| 2137                              | 1   | 48  | 6100  | 3660  | 0    | 1769  | 305  | 366  | 0    | 225 | 48.8 | 5.38 | 91  | 15.6 |       |     |    | 8.7 | 4.60 | 4.1  | 1.1 |     |
| 2138                              | 2   | 38  | 10300 | 6180  | 103  | 2678  | 309  | 103  | 0    | 438 | 37.8 | 4.15 | 91  | 13.5 |       |     |    | 8.5 | 4.20 | 4.3  | 1.0 |     |
| 2139                              | 2   | 68  | 6400  | 1512  | 0    | 3528  | 448  | 112  | 0    | 348 | 43.5 | 3.88 | 95  | 13.8 | 5.60  |     |    | 7.8 | 4.00 | 3.8  | 1.1 |     |
| 2140                              | 2   | 79  | 7800  | 4774  |      | 2079  | 231  | 308  | 308  | 188 | 30.9 | 3.35 | 92  | 10.0 |       |     |    | 7.2 | 3.60 | 3.6  | 1.0 |     |
| 2142                              | 1   | 38  | 10900 | 6867  | 0    | 3379  | 109  | 218  | 218  | 268 | 47.3 | 4.92 | 96  | 15.5 |       |     |    | 7.2 | 3.70 | 3.5  | 1.0 |     |
| 2143                              | 1   | 35  | 5700  | 3591  | 57   | 1482  | 456  | 114  | 57   | 305 | 44.5 | 5.15 | 86  | 15.1 |       |     |    | 7.7 | 4.00 | 3.7  | 1.1 |     |
| 2144                              | 1   | 39  | 8400  | 4368  | 0    | 3612  | 420  | 0    | 0    | 180 | 53.7 | 5.47 | 98  | 17.1 |       |     |    | 7.9 | 4.40 | 3.5  | 1.3 |     |
| 2145                              | 1   | 65  | 5400  | 3294  | 0    | 1458  | 432  | 162  | 54   | 308 | 42.6 | 4.33 | 98  | 13.9 | 2.00  |     |    | 7.9 | 4.00 | 3.9  | 1.0 |     |
| 2147                              | 2   | 37  | 7300  | 4672  | 0    | 2263  | 292  | 73   | 0    | 313 | 40.7 | 4.66 | 89  | 13.7 |       |     |    | 7.7 | 4.00 | 3.7  | 1.1 |     |
| 2148                              | 1   | 77  | 8100  | 4131  | 0    | 2835  | 810  | 243  | 81   | 223 | 39.3 | 4.17 | 94  | 13.2 | 3.90  |     |    | 7.7 | 4.00 | 3.7  | 1.1 |     |
| 2149                              | 2   | 41  | 6700  | 2613  | 0    | 3350  | 201  | 402  | 134  | 255 | 39.0 | 4.14 | 94  | 12.8 |       |     |    | 7.7 | 3.90 | 3.8  | 1.0 |     |
| 2150                              | 1   | 45  | 8300  | 5063  | 0    | 2822  | 249  | 166  | 0    | 218 | 47.1 | 5.43 | 87  | 14.5 | 1.00  |     |    |     |      |      |     |     |
| 2152                              | 1   | 50  | 5500  | 3245  | 110  | 1375  | 275  | 495  | 0    | 300 | 48.5 | 5.06 | 96  | 15.6 |       |     |    | 8.5 | 4.40 | 4.1  | 1.1 |     |
| 2155                              | 1   | 33  | 9300  | 6138  | 0    | 2790  | 93   | 279  | 0    | 366 | 49.2 | 5.62 | 88  | 15.8 |       |     |    | 7.9 | 4.60 | 3.3  | 1.4 |     |
| 2156                              | 1   | 42  | 8200  | 3936  | 164  | 3690  | 410  | 0    | 0    | 230 | 55.7 | 5.70 | 98  | 17.4 |       |     |    | 7.0 | 4.10 | 2.9  | 1.4 |     |
| 2158                              | 2   | 62  | 5600  | 2240  | 0    | 3080  | 166  | 56   | 56   | 310 | 39.8 | 4.40 | 90  | 13.0 |       |     |    | 8.4 | 4.10 | 4.3  | .9  |     |
| 2159                              | 2   | 38  | 7600  | 3876  | 0    | 2964  | 380  | 380  | 0    | 410 | 42.9 | 4.60 | 93  | 14.3 |       |     |    | 7.8 | 4.20 | 3.6  | 1.2 |     |
| 2160                              | 2   | 37  | 5800  | 2262  | 58   | 2494  | 290  | 580  | 0    | 370 | 45.4 | 5.04 | 90  | 14.9 | 8.10  |     |    | 8.2 | 4.10 | 4.1  | 1.0 |     |
| 2162                              | 2   | 65  | 9200  | 3664  | 92   | 4140  | 0    | 1104 | 0    | 375 | 40.8 | 4.55 | 89  | 11.8 | 4.10  |     |    | 8.9 | 3.60 | 5.3  | .7  |     |
| 2165                              | 1   | 43  | 8200  | 3444  | 0    | 3936  | 574  | 82   | 164  | 332 | 44.4 | 5.00 | 89  | 14.8 |       |     |    | 8.3 | 4.30 | 4.0  | 1.1 |     |
| 2166                              | 1   | 70  | 5600  | 3640  | 0    | 1344  | 280  | 336  | 0    | 223 | 41.1 | 4.38 | 95  | 13.0 | 3.10  |     |    | 7.2 | 3.60 | 3.6  | 1.0 |     |
| 2167                              | 1   | 47  | 7100  | 3479  | 71   | 2911  | 284  | 284  | 71   | 313 | 43.8 | 4.81 | 91  | 15.5 |       |     |    | 7.4 | 4.00 | 3.4  | 1.2 |     |
| 2171                              | 2   | 35  | 8200  | 5412  | 0    | 2214  | 246  | 328  | 0    | 275 | 42.3 | 4.65 | 91  | 13.4 | .50   |     |    | 7.8 | 3.80 | 4.0  |     |     |
| 2172                              | 2   | 45  | 6900  | 3864  | 0    | 2553  | 207  | 207  | 69   | 403 | 44.9 | 4.92 | 91  | 13.7 | 2.30  |     |    | 7.6 | 3.60 | 4.0  | .9  |     |
| 2174                              | 1   | 33  | 8800  | 5280  | 0    | 1848  | 1056 | 616  | 0    | 370 | 49.3 | 5.36 | 92  | 16.5 |       |     |    | 8.0 | 4.40 | 3.6  | 1.2 |     |
| 2176                              | 1   | 43  | 6800  | 3604  | 68   | 2584  | 476  | 204  | 0    | 350 | 47.9 | 4.87 | 98  | 14.8 | 1.20  |     |    | 9.5 | 5.30 | 4.2  | 1.2 |     |
| 2182                              | 2   | 85  | 5300  | 2173  | 0    | 2862  | 265  | 0    | 0    | 283 | 37.8 | 4.02 | 94  | 12.1 | 2.60  |     |    | 8.8 | 4.50 | 4.3  | 1.0 |     |
| 2188                              | 1   | 36  | 5700  | 2508  | 0    | 1710  | 684  | 627  | 114  | 200 | 50.3 | 5.50 | 91  | 16.3 |       |     |    |     |      |      |     |     |
| 2189                              | 2   | 59  | 8400  | 6300  | 168  | 924   | 840  | 168  | 0    | 330 | 21.9 | 2.34 | 94  | 7.7  |       |     |    | 7.2 | 3.30 | 3.8  | .8  |     |
| 2193                              | 2   | 64  | 5600  | 3690  |      | 1624  | 56   | 224  |      | 283 | 31.5 | 3.34 | 94  | 10.4 | 2.60  |     |    | 7.3 | 3.80 | 3.5  | 1.1 |     |
| 2195                              | 2   | 67  | 6600  | 3640  | 130  | 2275  | 130  | 260  | 65   | 343 | 41.2 | 4.66 | 85  | 13.5 | 2.10  |     |    | 7.5 | 4.20 | 3.3  | 1.3 |     |
| 2196                              | 2   | 71  | 6600  | 3300  | 0    | 2310  | 198  | 792  | 0    | 218 | 40.6 | 4.49 | 90  | 13.4 | 10.00 |     |    | 8.3 | 4.40 | 3.9  | 1.1 |     |
| 2197                              | 2   | 34  | 7200  | 3168  | 72   | 3456  | 288  | 72   | 144  | 298 | 39.8 | 4.46 | 89  | 12.9 | 4.00  |     |    | 7.9 | 4.20 | 3.7  | 1.1 |     |
| 2205                              | 1   | 62  | 9500  | 4465  | 0    | 4750  | 285  | 0    | 0    | 330 | 47.9 | 5.45 | 88  | 13.7 |       |     |    | 7.4 | 3.70 | 3.7  | 1.0 |     |

| COMPUTER LISTING OF 1986 RAW DATA |     |     |       |      |      |       |      |      |      |      |      |      |      |      |      |     |    |     |      |      |     |   |
|-----------------------------------|-----|-----|-------|------|------|-------|------|------|------|------|------|------|------|------|------|-----|----|-----|------|------|-----|---|
| PID                               | SEX | AGE | WBC   | PMN  | BAND | LYMPH | MONO | EOS  | BASO | PLT  | HCT  | RBC  | MCV  | HGB  | TSH  | PRL | T4 | TPR | ALB  | GLOB | A/G | C |
| 2208                              | 1   | 65  | 8500  | 4675 |      | 2975  | 510  | 170  | 170  | 240  | 45.3 | 4.95 | 92   | 14.4 |      |     |    | 7.7 | 3.80 | 3.9  | 1.0 |   |
| 2207                              | 1   | 38  | 7000  | 3010 | 0    | 3500  | 0    | 420  | 70   | 288  | 44.8 | 5.15 | 87   | 13.9 |      |     |    | 8.0 | 3.80 | 4.2  | .9  |   |
| 2208                              | 2   | 70  | 10800 | 8264 | 0    | 3240  | 218  | 864  | 218  | 380  | 40.9 | 4.47 | 91   | 13.9 |      |     |    | 8.1 | 3.80 | 4.5  | .8  |   |
| 2209                              | 2   | 38  | 9300  | 5788 | 93   | 2139  | 93   | 930  | 279  | 488  | 36.3 | 4.07 | 89   | 12.8 |      |     |    | 7.9 | 3.70 | 4.2  | .9  |   |
| 2210                              | 2   | 33  | 9500  | 7410 | 0    | 1520  | 475  | 95   | 0    | 273  | 39.9 | 4.22 | 95   | 12.4 |      |     |    | 7.2 | 3.20 | 4.0  | .8  |   |
| 2212                              | 2   | 67  | 8100  | 4536 | 0    | 2754  | 162  | 687  | 81   | 293  | 26.9 | 2.98 | 90   | 8.9  | 2.50 |     |    | 6.0 | 2.30 | 3.7  | .6  |   |
| 2213                              | 2   | 34  | 8300  | 3852 | 0    | 3984  | 249  | 415  | 0    | 373  | 39.0 | 4.40 | 89   | 12.6 |      |     |    | 8.1 | 3.80 | 4.3  | .9  |   |
| 2215                              | 2   | 66  | 7800  | 3800 | 0    | 2738  | 380  | 684  | 0    | 348  | 47.5 | 5.83 | 84   | 14.7 |      |     |    | 8.1 | 3.70 | 4.4  | .8  |   |
| 2216                              | 2   | 67  | 9000  | 6210 | 0    | 2250  | 90   | 360  | 90   | 445  | 36.3 | 4.29 | 86   | 12.9 |      |     |    | 8.6 | 3.30 | 5.3  | .6  |   |
| 2217                              | 2   | 54  | 8600  | 3366 | 132  | 2640  | 132  | 330  | 132  | 253  | 44.1 | 4.45 | 99   | 14.2 |      |     |    | 8.6 | 3.70 | 4.9  | .7  |   |
| 2220                              | 2   | 55  | 5700  | 2166 | 57   | 3135  | 0    | 342  | 0    | 273  | 43.8 | 4.63 | 95   | 14.5 |      |     |    | 8.5 | 4.50 | 4.0  | 1.1 |   |
| 2221                              | 2   | 55  | 5700  | 3192 | 0    | 1995  | 399  | 114  | 0    | 273  | 36.7 | 4.01 | 97   | 12.3 | 4.10 |     |    | 7.7 | 3.30 | 4.4  | .7  |   |
| 2224                              | 2   | 64  | 7100  | 4615 | 213  | 1917  | 355  | 0    | 0    | 295  | 34.0 | 3.55 | 96   | 11.2 |      |     |    | 7.9 | 4.30 | 3.6  | 1.2 |   |
| 2225                              | 2   | 39  | 6500  | 5006 | 130  | 975   | 65   | 195  | 130  | 232  | 28.1 | 3.13 | 90   | 9.4  | 0.00 |     |    | 7.6 | 3.30 | 4.3  | .8  |   |
| 2226                              | 2   | 34  | 5900  | 3858 | 59   | 1652  | 295  | 118  | 118  | 255  | 35.8 | 4.17 | 86   | 12.1 | 2.00 |     |    | 7.0 | 3.30 | 3.7  | .9  |   |
| 2227                              | 2   | 37  | 10200 | 6630 | 0    | 2448  | 612  | 408  | 102  | 475  | 27.6 | 3.72 | 74   | 9.1  |      |     |    | 7.4 | 3.20 | 4.2  | .8  |   |
| 2228                              | 2   | 41  | 11800 | 6380 | 0    | 3828  | 580  | 696  | 116  | 450  | 42.0 | 4.72 | 89   | 13.2 |      |     |    | 9.2 | 5.00 | 4.2  | 1.2 |   |
| 2229                              | 2   | 51  | 8200  | 5248 | 82   | 2050  | 574  | 246  | 0    | 345  | 41.1 | 4.46 | 92   | 13.7 |      |     |    | 7.1 | 3.60 | 3.5  | 1.0 |   |
| 2230                              | 2   | 45  | 7200  | 4536 | 144  | 1872  | 72   | 576  | 0    | 283  | 42.3 | 5.05 | 84   | 14.4 | 1.50 |     |    | 8.0 | 4.40 | 3.6  | 1.2 |   |
| 2231                              | 2   | 34  | 8700  | 5655 | 87   | 1740  | 348  | 0    | 261  | 558  | 44.4 | 5.26 | 84   | 14.7 |      |     |    | 8.6 | 4.40 | 4.2  | 1.0 |   |
| 2232                              | 1   | 35  | 6800  | 3608 | 0    | 3872  | 792  | 440  | 88   | 225  | 51.4 | 5.32 | 97   | 16.7 | 5.80 |     |    | 7.4 | 4.10 | 3.3  | 1.2 |   |
| 2233                              | 1   | 33  | 8500  | 4505 | 85   | 3455  | 85   | 340  | 0    | 288  | 51.0 | 5.44 | 94   | 17.3 |      |     |    | 8.7 | 4.80 | 3.9  | 1.2 |   |
| 2235                              | 1   | 40  | 6700  | 3350 | 0    | 2814  | 67   | 402  | 67   | 265  | 45.5 | 5.25 | 92   | 14.7 |      |     |    | 7.8 | 4.30 | 3.5  | 1.2 |   |
| 2236                              | 1   | 44  | 9200  | 5428 | 0    | 3588  | 0    | 92   | 92   | 236  | 42.6 | 4.97 | 86   | 14.9 |      |     |    | 8.8 | 4.50 | 4.3  | 1.1 |   |
| 2237                              | 1   | 39  | 6300  | 2772 | 0    | 2961  | 378  | 63   | 126  | 353  | 42.5 | 4.56 | 93   | 14.3 |      |     |    | 8.0 | 4.40 | 3.6  | 1.2 |   |
| 2239                              | 2   | 36  | 5300  | 2703 | 0    | 2014  | 106  | 477  | 277  | 33.0 | 3.73 | 88   | 11.2 | 3.20 |      |     |    |     |      |      |     |   |
| 2242                              | 1   | 33  | 5700  | 3308 | 0    | 1653  | 399  | 285  | 57   | 248  | 51.3 | 5.51 | 93   | 15.9 |      |     |    | 8.0 | 4.50 | 3.5  | 1.3 |   |
| 2244                              | 2   | 77  | 5000  | 2400 | 50   | 2050  | 50   | 450  | 0    | 270  | 40.5 | 4.09 | 99   | 12.3 |      |     |    | 8.1 | 3.70 | 4.4  | .9  |   |
| 2245                              | 1   | 33  | 7700  | 2695 | 0    | 3850  | 847  | 231  | 77   | 300  | 50.1 | 5.15 | 97   | 16.1 |      |     |    | 7.8 | 4.50 | 3.3  | 1.3 |   |
| 2247                              | 2   | 41  | 8200  | 4510 | 0    | 2706  | 738  | 246  | 0    | 310  | 39.5 | 4.29 | 92   | 12.7 |      |     |    | 7.7 | 3.90 | 3.6  | 1.0 |   |
| 2248                              | 2   | 48  | 8900  | 3916 | 0    | 2848  | 445  | 1513 | 178  | 248  | 45.0 | 5.45 | 83   | 13.7 |      |     |    | 8.1 | 4.20 | 3.9  | 1.1 |   |
| 2250                              | 1   | 43  | 8600  | 3784 | 0    | 3870  | 258  | 602  | 86   | 353  | 47.1 | 5.38 | 88   | 15.8 |      |     |    | 7.7 | 4.80 | 2.9  | 1.5 |   |
| 2251                              | 2   | 38  | 10200 | 6428 | 0    | 2856  | 306  | 510  | 102  | 395  | 37.5 | 4.95 | 75   | 12.5 |      |     |    | 8.2 | 4.00 | 4.2  | 1.0 |   |
| 2254                              | 2   | 37  | 5800  | 3074 | 0    | 1740  | 174  | 696  | 116  | 410  | 34.3 | 4.66 | 74   | 10.7 |      |     |    | 8.3 | 3.80 | 4.5  | .9  |   |
| 2255                              | 2   | 33  | 7400  | 3922 | 0    | 2886  | 296  | 74   | 222  | 183  | 43.0 | 4.82 | 89   | 13.8 |      |     |    | 7.1 | 3.60 | 3.5  | 1.0 |   |
| 2256                              | 2   | 38  | 6400  | 2944 | 128  | 3328  | 0    | 0    | 0    | 300  | 36.4 | 4.23 | 91   | 12.8 |      |     |    | 7.3 | 3.60 | 3.7  | 1.0 |   |
| 2257                              | 1   | 40  | 6900  | 4968 | 69   | 1380  | 276  | 138  | 69   | 283  | 45.6 | 5.55 | 82   | 15.8 |      |     |    | 7.9 | 4.40 | 3.5  | 1.4 |   |
| 2260                              | 2   | 33  | 8300  | 3486 | 166  | 3984  | 332  | 332  | 0    | 405  | 42.2 | 4.45 | 95   | 14.3 |      |     |    | 7.6 | 4.10 | 3.5  | 1.2 |   |
| 2261                              | 1   | 55  | 6200  | 3224 | 104  | 1404  | 418  | 52   | 0    | 218  | 48.3 | 5.13 | 94   | 16.2 |      |     |    | 8.0 | 4.30 | 3.7  | 1.1 |   |
| 2269                              | 1   | 32  | 13200 | 9372 | 0    | 3036  | 660  | 132  | 132  | 263  | 48.7 | 5.00 | 97   | 16.5 |      |     |    | 7.6 | 4.40 | 3.2  | 1.4 |   |
| 2271                              | 1   | 32  | 7900  | 2923 | 0    | 3950  | 711  | 316  | 0    | 295  | 48.5 | 5.39 | 90   | 15.9 | 3.60 |     |    | 8.5 | 5.00 | 3.5  | 1.4 |   |
| 2273                              | 1   | 33  | 7100  | 2414 | 0    | 3906  | 639  | 142  | 0    | 310  | 49.7 | 5.89 | 84   | 17.1 | 1.20 |     |    | 8.5 | 4.90 | 3.6  | 1.3 |   |
| 2274                              | 1   | 32  | 7600  | 3268 | 76   | 3724  | 380  | 76   | 76   | 473  | 47.8 | 5.41 | 87   | 15.4 |      |     |    | 8.1 | 4.50 | 3.6  | 1.2 |   |
| 2276                              | 1   | 33  | 10200 | 3876 | 0    | 5610  | 102  | 408  | 204  | 305  | 53.0 | 5.75 | 92   | 18.1 |      |     |    | 9.5 | 5.50 | 4.0  | 1.4 |   |
| 806                               | 2   | 33  | 7800  | 4524 | 234  | 2106  | 312  | 624  | 0    | 343  | 35.4 | 4.00 | 88   | 11.3 |      |     |    | 6.7 | 3.20 | 3.5  | .9  |   |
| 812                               | 2   | 32  | 8500  | 6290 | 1360 | 425   | 340  | 85   | 0    | 200  | 30.7 | 3.30 | 93   | 10.5 |      |     |    | 6.7 | 3.70 | 3.0  | 1.2 |   |
| 816                               | 2   | 37  | 5200  | 2704 |      | 1924  | 104  | 416  | 52   | 143  | 32.2 | 3.93 | 82   | 11.1 |      |     |    | 6.6 | 3.30 | 3.3  | 1.0 |   |
| 821                               | 2   | 38  |       |      |      |       |      |      |      |      |      |      |      |      |      |     |    | 7.0 | 4.00 | 3.0  | 1.4 |   |
| 823                               | 1   | 43  | 6700  | 4288 | 0    | 1943  | 201  | 201  | 67   | 185  | 42.5 | 4.45 | 95   | 14.4 |      |     |    | 8.0 | 3.70 | 4.3  | .9  |   |
| 825                               | 2   | 45  | 7000  | 2660 | 0    | 4060  | 280  | 0    | 0    | 250  | 39.7 | 4.61 | 86   | 13.5 |      |     |    | 9.2 | 4.00 | 5.2  | .8  |   |
| 826                               | 2   | 50  | 4400  | 2200 | 132  | 1320  | 396  | 352  | 0    | 218  | 39.5 | 4.29 | 92   | 12.3 |      |     |    | 8.7 | 3.80 | 4.9  | .8  |   |
| 829                               | 2   | 49  | 6800  | 3468 | 0    | 3060  | 204  | 0    | 88   | 420  | 36.0 | 3.88 | 93   | 12.6 |      |     |    | 7.2 | 3.70 | 3.6  | 1.1 |   |
| 830                               | 1   | 48  | 6800  | 4964 | 204  | 884   | 204  | 544  | 0    | 203  | 42.7 | 4.39 | 97   | 15.0 |      |     |    | 8.3 | 3.70 | 4.5  |     |   |
| 831                               | 1   | 48  | 9300  | 3534 | 0    | 4557  | 558  | 372  | 279  | 323  | 45.5 | 4.87 | 93   | 15.6 |      |     |    |     |      |      |     |   |



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| COMPUTER LISTING OF 1986 RAW DATA |     |     |       |      |      |       |      |      |      |     |      |      |     |      |      |     |    |     |      |      |     |     |
|-----------------------------------|-----|-----|-------|------|------|-------|------|------|------|-----|------|------|-----|------|------|-----|----|-----|------|------|-----|-----|
| PID                               | SEX | AGE | WBC   | PMN  | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH  | PRL | T4 | TPR | ALB  | GLOB | A/G | CAL |
| 832                               | 2   | 49  | 5400  | 2592 | 0    | 2538  | 162  | 108  | 0    | 325 | 37.8 | 4.63 | 82  | 12.8 |      |     |    | 7.6 | 3.90 | 3.7  | 1.0 |     |
| 833                               | 1   | 54  | 5500  | 1980 | 0    | 3025  | 330  | 110  | 55   | 345 | 44.5 | 5.15 | 86  | 14.5 |      |     |    | 7.5 | 3.90 | 3.6  | 1.1 |     |
| 834                               | 1   | 53  | 6300  | 4221 | 0    | 1764  | 189  | 126  |      | 212 | 46.7 | 5.33 | 88  | 15.8 |      |     |    |     |      |      |     |     |
| 835                               | 2   | 53  | 9300  | 3255 | 0    | 5394  | 186  | 372  | 93   | 203 | 43.6 | 4.84 | 96  | 15.1 |      |     |    | 7.6 | 3.60 | 4.0  | .9  |     |
| 840                               | 1   | 56  | 8800  | 4664 | 0    | 2376  | 704  | 1056 | 0    | 198 | 46.4 | 5.82 | 80  | 15.2 |      |     |    | 8.1 | 4.10 | 4.0  | 1.0 |     |
| 841                               | 2   | 54  | 9700  | 5432 | 97   | 2910  | 873  | 388  | 0    | 263 | 36.3 | 3.90 | 93  | 12.3 |      |     |    | 8.2 | 3.70 | 4.5  | .8  |     |
| 843                               | 2   | 58  | 5500  | 2640 | 0    | 1980  | 385  | 440  | 55   | 235 | 40.5 | 4.26 | 95  | 12.8 |      |     |    | 7.3 | 3.30 | 4.0  | .8  |     |
| 844                               | 2   | 68  | 5200  | 2808 | 0    | 2028  | 364  | 0    | 0    | 210 | 38.0 | 3.99 | 95  | 12.7 |      |     |    | 8.6 | 4.00 | 4.6  | .9  |     |
| 845                               | 1   | 57  | 9100  | 4459 | 0    | 3822  | 728  | 91   | 0    | 290 | 42.6 | 4.63 | 92  | 13.6 |      |     |    | 7.3 | 3.70 | 3.6  | 1.0 |     |
| 846                               | 2   | 63  | 1800  | 306  | 0    | 1386  | 0    | 54   | 0    | 164 | 21.0 | 1.95 | 108 | 6.4  |      |     |    |     |      |      |     |     |
| 851                               | 2   | 77  | 5400  | 2754 | 54   | 2106  | 108  | 108  | 0    | 293 | 36.8 | 3.87 | 97  | 12.7 |      |     |    | 7.8 | 3.60 | 4.2  | .9  |     |
| 863                               | 1   | 35  | 6500  | 3055 | 0    | 3055  | 260  | 65   | 65   | 290 | 54.0 | 5.49 | 98  | 17.6 |      |     |    | 7.8 | 3.70 | 4.1  | .9  |     |
| 864                               | 1   | 60  | 6400  | 2944 | 0    | 2816  | 192  | 448  | 0    | 228 | 45.1 | 5.06 | 89  | 14.3 |      |     |    |     |      |      |     |     |
| 865                               | 2   | 52  | 6800  | 2924 | 0    | 3264  | 408  | 204  | 0    | 220 | 44.2 | 4.64 | 95  | 14.3 | 2.40 |     |    | 7.8 | 4.20 | 3.6  | 1.2 |     |
| 867                               | 2   | 58  | 7300  | 2774 | 73   | 4161  | 146  | 73   | 73   | 343 | 46.2 | 5.06 | 91  | 15.7 |      |     |    | 7.9 | 3.60 | 4.3  | .8  |     |
| 881                               | 1   | 54  | 8400  | 4704 | 0    | 3444  | 168  | 0    | 84   | 253 | 42.4 | 4.79 | 89  | 14.6 |      |     |    | 7.8 | 3.50 | 4.3  | .8  |     |
| 882                               | 1   | 54  | 8000  | 4000 | 0    | 2880  | 80   | 1040 | 0    | 275 | 46.4 | 5.59 | 83  | 16.0 |      |     |    | 7.6 | 3.60 | 4.0  | .9  |     |
| 883                               | 1   | 75  | 7000  |      |      |       |      |      |      |     | 45.0 |      |     |      |      |     |    |     |      |      |     |     |
| 888                               | 2   | 57  | 10000 |      |      |       |      |      |      |     | 45.0 |      |     |      |      |     |    |     |      |      |     |     |
| 891                               | 2   | 38  | 6500  | 2990 | 0    | 3055  | 130  | 260  | 65   | 353 | 46.7 | 4.93 | 95  | 14.8 |      |     |    | 7.6 | 3.50 | 4.0  | .9  |     |
| 896                               | 2   | 47  | 3900  | 2808 | 39   | 555   | 273  | 78   | 117  |     |      |      |     |      |      |     |    |     |      |      |     |     |
| 911                               | 2   | 34  | 5600  | 3752 | 0    | 1232  | 168  | 392  | 56   | 305 | 39.0 | 4.30 | 91  | 13.1 |      |     |    | 7.5 | 3.80 | 3.7  | 1.0 |     |
| 914                               | 2   | 52  | 9800  | 4214 | 0    | 4018  | 392  | 1078 | 98   | 120 | 34.1 | 3.81 | 89  | 11.2 |      |     |    | 7.3 | 3.80 | 3.5  | 1.1 |     |
| 917                               | 1   | 66  | 7000  | 4200 | 70   | 2380  | 70   | 280  | 0    | 238 | 39.6 | 4.49 | 88  | 12.4 | 3.00 |     |    | 6.9 | 3.40 | 3.6  | 1.0 |     |
| 919                               | 1   | 38  | 5100  | 2142 | 0    | 2193  | 510  | 183  | 102  | 258 | 42.4 | 4.83 | 88  | 13.7 |      |     |    | 8.3 | 3.70 | 4.6  | .8  |     |
| 920                               | 1   | 55  | 6200  | 2294 | 0    | 2976  | 186  | 744  | 0    | 178 | 45.9 | 4.84 | 95  | 15.6 |      |     |    | 8.8 | 3.90 | 4.9  | .8  |     |
| 928                               | 2   | 74  | 6300  | 4221 | 441  | 1260  | 252  | 126  | 0    | 270 | 35.7 | 3.72 | 96  | 10.6 |      |     |    | 9.0 | 3.70 | 5.3  | .7  |     |
| 931                               | 1   | 33  | 13200 | 7856 | 0    | 4356  | 792  | 396  | 0    | 235 | 60.5 | 5.90 | 103 | 19.6 |      |     |    | 7.4 | 4.10 | 3.3  | 1.3 |     |
| 932                               | 2   | 62  | 7600  | 4070 |      | 2664  | 148  | 518  |      | 262 | 37.5 | 4.09 | 92  | 12.7 |      |     |    | 8.1 | 3.70 | 4.4  | .8  |     |
| 934                               | 2   | 62  | 6100  | 2806 | 61   | 2379  | 0    | 183  | 0    | 305 | 46.2 | 5.48 | 84  | 14.3 |      |     |    | 7.9 | 3.70 | 4.2  | .9  |     |
| 938                               | 2   | 54  | 6400  | 4224 | 0    | 1664  | 64   | 384  | 64   | 195 | 41.2 | 4.63 | 89  | 13.1 |      |     |    | 8.1 | 3.70 | 4.4  | .8  |     |
| 939                               | 1   | 41  | 8500  | 3655 | 0    | 4250  | 0    | 425  | 170  | 320 | 43.5 | 4.75 | 92  | 14.8 |      |     |    | 7.7 | 3.90 | 3.8  | 1.0 |     |
| 942                               | 2   | 72  | 4900  | 2205 | 0    | 2548  | 147  | 147  | 0    | 218 | 38.1 | 4.04 | 94  | 12.9 |      |     |    | 7.4 | 3.60 | 3.8  | .9  |     |
| 943                               | 1   | 55  | 9400  |      |      |       |      |      |      | 203 |      |      |     |      |      |     |    |     |      |      |     |     |
| 944                               | 1   | 62  | 6000  | 4140 | 0    | 1320  | 180  | 240  | 120  | 200 | 50.2 | 5.65 | 89  | 15.4 |      |     |    | 7.6 | 4.40 | 3.2  | 1.4 |     |
| 955                               | 2   | 35  | 6400  | 3712 | 64   | 1728  | 256  | 576  | 64   | 303 | 38.8 | 4.12 | 94  | 12.8 |      |     |    | 7.8 | 4.00 | 3.8  | 1.1 |     |
| 956                               | 2   | 77  | 7400  | 3996 | 74   | 2960  | 148  | 222  | 0    | 313 | 35.9 | 3.80 | 94  | 11.8 |      |     |    | 7.4 | 3.90 | 3.6  | 1.1 |     |
| 958                               | 1   | 55  | 8900  | 3827 | 178  | 3738  | 356  | 712  | 89   | 298 | 36.7 | 4.01 | 92  | 12.4 |      |     |    | 7.9 | 4.30 | 3.6  | 1.2 |     |
| 959                               | 2   | 37  | 6700  | 3015 | 67   | 2077  | 268  | 1139 | 0    | 250 | 40.6 | 4.58 | 88  | 13.8 |      |     |    | 7.2 | 3.90 | 3.3  | 1.2 |     |
| 960                               | 2   | 35  | 13100 | 7336 | 131  | 4978  | 262  | 393  | 0    | 403 | 38.1 | 4.35 | 88  | 12.8 |      |     |    | 7.9 | 4.00 | 3.9  | 1.0 |     |
| 965                               | 2   | 43  | 7600  | 4788 | 152  | 1672  | 304  | 684  | 0    | 395 | 40.1 | 4.67 | 86  | 12.6 |      |     |    | 7.9 | 3.90 | 4.0  | 1.0 |     |
| 966                               | 1   | 55  | 5000  | 2900 | 50   | 1550  | 100  | 400  | 0    | 193 | 40.0 | 4.26 | 96  | 13.0 |      |     |    | 7.5 | 4.20 | 3.3  | 1.2 |     |
| 971                               | 1   | 44  | 7800  | 3354 | 78   | 3510  | 468  | 390  | 0    | 373 | 48.7 | 5.28 | 92  | 16.4 |      |     |    | 8.7 | 5.20 | 3.5  | 1.5 |     |
| 977                               | 2   | 40  | 8100  | 3645 | 81   | 2916  | 243  | 1134 | 81   | 273 | 46.1 | 5.19 | 89  | 15.1 |      |     |    | 8.6 | 4.20 | 4.4  | .8  |     |
| 980                               | 2   | 34  | 11400 | 7182 | 0    | 3420  | 456  | 228  | 114  | 283 | 46.3 | 5.12 | 90  | 14.0 |      |     |    | 7.7 | 4.00 | 3.7  | 1.1 |     |
| 981                               | 1   | 33  | 4400  | 2288 | 0    | 1892  | 132  | 88   | 0    | 195 | 43.7 | 4.77 | 92  | 15.0 |      |     |    | 7.2 | 4.30 | 2.9  | 1.5 |     |
| 998                               | 2   | 39  | 9300  | 5952 | 93   | 2790  | 372  | 93   | 0    | 158 | 39.8 | 4.39 | 91  | 13.4 |      |     |    | 7.2 | 3.4  | 3.8  | .9  |     |
| 1001                              | 2   | 53  | 8700  | 3149 | 0    | 2814  | 536  | 201  | 0    | 323 | 44.0 | 5.26 | 84  | 14.4 |      |     |    | 8.2 | 4.40 | 3.8  | 1.2 |     |
| 1007                              | 1   | 76  | 5100  | 2754 | 0    | 2091  | 153  | 102  | 0    | 298 | 39.9 | 4.38 | 91  | 13.5 |      |     |    | 7.6 |      | 3.6  | 1.1 |     |
| 1500                              | 1   | 56  | 6100  | 3843 | 0    | 1891  | 244  | 122  | 0    | 243 | 34.5 | 4.02 | 86  | 12.1 | 1.40 |     |    | 7.7 | 3.80 | 3.9  | 1.0 |     |
| 1519                              | 1   | 44  | 6900  | 3381 | 0    | 2622  | 483  | 345  | 69   | 255 | 45.8 | 5.04 | 91  | 15.8 |      |     |    | 7.6 | 4.20 | 3.4  | 1.3 |     |
| 1520                              | 2   | 56  | 6100  | 1952 | 0    | 3599  | 366  | 122  | 61   | 255 | 41.1 | 4.87 | 84  | 14.3 |      |     |    | 7.3 | 3.90 | 3.4  | 1.2 |     |
| 1524                              | 1   | 44  | 10100 | 2828 | 0    | 6868  | 202  | 101  | 101  | 220 | 47.5 | 5.21 | 91  | 16.1 |      |     |    | 7.8 | 4.40 | 3.4  | 1.3 |     |
| 1525                              | 2   | 43  | 6900  | 3933 | 69   | 2553  | 207  | 138  | 0    | 313 | 39.7 | 4.27 | 93  | 13.0 |      |     |    | 7.2 | 4.00 | 3.2  | 1.2 |     |

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| PID  | SEX | AGE | WBC   | PMN  | BAND | LYMPH | COMPUTER LISTING OF 1988 RAW DATA |      |      |     |      |      |     | TSH  | PRL  | T4 | TPR | ALB  | GLOB | A/G | C   |
|------|-----|-----|-------|------|------|-------|-----------------------------------|------|------|-----|------|------|-----|------|------|----|-----|------|------|-----|-----|
|      |     |     |       |      |      |       | MONO                              | EOS  | BASO | PLT | HCT  | RBC  | MCV |      |      |    |     |      |      |     |     |
| 1528 | 1   | 58  | 8100  | 4698 | 0    | 2511  | 243                               | 567  | 81   | 308 | 35.8 | 4.06 | 88  | 12.7 |      |    |     | 7.6  | 3.80 | 3.8 | 1.0 |
| 1529 | 1   | 39  | 11600 | 8004 | 118  | 2784  | 232                               | 464  | 0    | 183 | 49.1 | 5.57 | 88  | 15.3 |      |    |     | 7.4  | 4.30 | 3.1 | 1.4 |
| 1541 | 2   | 59  | 5800  | 2282 | 0    | 3018  | 174                               | 290  | 0    | 338 | 40.5 | 4.51 | 90  | 12.6 |      |    |     | 7.8  | 4.20 | 3.6 | 1.2 |
| 1542 | 2   | 33  | 9100  | 5096 | 0    | 3367  | 548                               | 0    | 91   | 206 | 41.7 | 5.17 | 81  | 14.3 |      |    |     | 7.1  | 3.90 | 3.2 | 1.2 |
| 1546 | 1   | 73  | 9900  | 3366 | 0    | 5445  | 99                                | 891  | 99   | 210 | 47.2 | 4.76 | 99  | 15.9 |      |    |     | 7.2  | 4.00 | 3.2 | 1.2 |
| 1548 | 2   | 45  | 12000 | 4880 | 120  | 2880  | 480                               | 3120 | 120  | 293 | 41.1 | 4.50 | 91  | 13.2 |      |    |     | 7.8  | 3.70 | 4.1 | .9  |
| 1552 | 1   | 57  | 6500  | 3575 | 0    | 2535  | 195                               | 195  | 0    | 320 | 46.4 | 5.16 | 90  | 14.8 | 1.90 |    |     | 10.4 | 5.90 | 4.5 | 1.3 |
| 1553 | 1   | 35  | 10000 | 5300 | 100  | 3700  | 500                               | 200  | 200  | 328 | 39.4 | 4.03 | 98  | 13.9 |      |    |     | 8.2  | 4.70 | 3.5 | 1.4 |
| 1555 | 2   | 44  | 8300  | 5063 | 0    | 2656  | 415                               | 166  | 0    | 260 | 48.5 | 6.04 | 80  | 15.6 |      |    |     | 7.8  | 4.20 | 3.6 | 1.2 |
| 1556 | 2   | 42  | 4100  | 2009 | 82   | 1555  | 205                               | 246  | 0    | 288 | 40.2 | 4.07 | 99  | 12.9 | 6.30 |    |     | 7.4  | 4.00 | 3.4 | 1.2 |
| 1558 | 2   | 36  | 6200  | 2356 | 0    | 2728  | 682                               | 372  | 62   | 248 | 44.6 | 4.55 | 98  | 14.0 | 2.40 |    |     | 7.4  | 3.80 | 3.6 | 1.0 |
| 1559 | 2   | 34  | 9000  | 4050 | 180  | 4410  | 270                               | 90   | 0    | 275 | 40.3 | 4.89 | 82  | 12.4 |      |    |     | 7.8  | 3.90 | 3.9 | 1.0 |
| 1563 | 1   | 50  | 6000  | 2820 | 60   | 2940  | 60                                | 120  | 0    | 235 | 47.6 | 5.15 | 92  | 15.1 |      |    |     | 8.0  | 4.40 | 3.6 | 1.2 |
| 1564 | 2   | 38  | 8200  | 3938 | 0    | 3118  | 246                               | 902  | 0    | 323 | 40.1 | 4.42 | 90  | 13.8 |      |    |     | 8.0  | 3.90 | 4.1 | 1.0 |
| 1566 | 2   | 36  | 9600  |      |      |       |                                   |      |      |     | 37.0 |      |     |      |      |    |     |      |      |     |     |
| 1570 | 2   | 65  | 8800  | 6072 | 0    | 2200  | 264                               | 264  | 0    | 418 | 45.4 | 4.98 | 91  | 14.3 |      |    |     | 13.2 | 6.30 | 6.9 | .9  |
| 1572 | 1   | 38  | 7400  | 3552 | 370  | 2590  | 666                               | 148  | 148  | 216 | 50.7 | 5.21 | 97  | 15.8 |      |    |     | 7.5  | 4.30 | 3.2 | 1.3 |
| 1573 | 1   | 36  | 7500  | 3525 | 0    | 3300  | 525                               | 160  | 0    |     | 50.2 | 5.26 | 95  | 17.4 |      |    |     |      |      |     |     |
| 1577 | 2   | 36  | 10400 | 5816 | 208  | 3744  | 418                               | 418  | 0    | 355 | 46.5 | 4.80 | 97  | 13.8 |      |    |     | 8.6  | 4.20 | 4.4 | 1.0 |

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| COMPUTER LISTING OF 1987 RAW DATA |     |     |       |      |      |       |      |      |      |      |      |      |     |      |        |     |       |       |      |
|-----------------------------------|-----|-----|-------|------|------|-------|------|------|------|------|------|------|-----|------|--------|-----|-------|-------|------|
| PID                               | SEX | AGE | WBC   | PMN  | BAND | LYMPH | MONO | EOS  | BASO | PLT  | HCT  | RBC  | MCV | HGB  | TSH    | PRL | T4    | FBS   | HBA1 |
| 2                                 | 1   | 34  | 8200  | 4592 | 0    | 2542  | 164  | 820  | 82   | 225  | 43.9 | 4.54 | 97  | 15.2 |        |     | 14.8  |       |      |
| 3                                 | 1   | 34  |       |      |      |       |      |      |      |      |      |      |     |      | 44.90  |     |       |       |      |
| 4                                 | 1   | 71  | 5800  | 1972 | 58   | 3421  | 290  | 0    | 58   | 270  | 43.1 | 5.02 | 86  | 16.5 | 1.50   |     |       | 229.0 | 15.  |
| 5                                 | 1   | 34  | 5400  | 1944 | 0    | 2538  | 648  | 324  | 0    | 190  | 44.3 | 4.71 | 94  | 14.0 | 51.40  |     |       |       |      |
| 7                                 | 1   | 67  | 6100  | 1528 | 0    | 3782  | 549  | 183  | 61   | 365  | 39.2 | 4.16 | 94  | 13.1 |        |     | 18.3  |       |      |
| 9                                 | 1   | 53  | 8800  | 5280 | 0    | 2904  | 264  | 264  | 88   | 175  | 43.9 | 4.59 | 96  | 15.0 | 1.60   |     |       |       |      |
| 10                                | 1   | 56  | 6800  | 4556 | 0    | 1836  | 272  | 0    | 136  | 255  | 46.0 | 5.34 | 86  | 15.1 | .20    |     | 8.3   | 131.0 | 8.   |
| 12                                | 2   | 49  | 5900  | 2008 | 118  | 3540  | 177  | 59   | 0    | 290  | 35.1 | 3.81 | 92  | 13.3 | 1.80   |     |       |       |      |
| 14                                | 2   | 57  | 7100  | 3063 | 0    | 3763  | 213  | 71   | 0    | 230  | 36.9 | 3.72 | 99  | 12.9 | 3.40   |     |       |       |      |
| 15                                | 2   | 40  | 11200 | 6272 | 0    | 3136  | 784  | 0    | 112  | 325  | 41.0 | 4.34 | 94  | 13.2 | 3.40   |     |       |       |      |
| 16                                | 1   | 72  | 6100  | 2867 | 61   | 2867  | 305  | 0    | 0    | 195  | 41.1 | 5.58 | 74  | 13.4 | .30    |     |       |       |      |
| 17                                | 2   | 36  | 8100  | 4293 | 0    | 3402  | 81   | 324  | 0    | 290  | 40.5 | 4.53 | 89  | 14.0 |        |     |       |       |      |
| 18                                | 2   | 54  | 6800  | 3400 | 0    | 2584  | 204  | 612  | 0    | 255  | 38.3 | 4.12 | 93  | 13.2 | 2.10   |     | 14.2  |       |      |
| 19                                | 1   | 38  | 9100  | 6918 | 0    | 1729  | 364  | 0    | 91   | 265  | 41.5 | 5.57 | 74  | 14.4 | 302.00 |     | 92.0  |       |      |
| 20                                | 1   | 39  | 9000  | 4500 | 0    | 3330  | 450  | 630  | 90   | 275  | 48.4 | 5.44 | 89  | 16.1 | 1.10   |     | 10.2  |       |      |
| 21                                | 2   | 35  | 5200  | 3536 | 0    | 1456  | 104  | 104  | 0    | 250  | 33.4 | 3.91 | 85  | 12.1 |        |     |       |       |      |
| 22                                | 2   | 48  | 5300  | 2703 | 0    | 2120  | 318  | 106  | 106  | 200  | 37.1 | 3.87 | 96  | 13.2 | .50    |     | 106.0 |       |      |
| 23                                | 1   | 36  | 7200  | 3600 | 0    | 3384  | 72   | 144  | 0    | 45.0 |      |      |     | 15.0 | 7.60   |     |       |       |      |
| 24                                | 2   | 46  | 6600  | 2310 | 0    | 3564  | 594  | 66   | 66   | 340  | 42.6 | 4.85 | 88  | 13.8 | .20    |     |       |       |      |
| 27                                | 1   | 59  | 9900  | 3661 | 0    | 4059  | 594  | 1386 | 0    | 145  | 43.4 | 4.32 | 100 | 15.6 |        |     | 105.0 |       | 9.   |
| 33                                | 2   | 34  | 6600  | 3432 | 0    | 2970  | 132  | 66   | 0    | 320  | 38.5 | 4.60 | 84  | 13.1 | 32.80  |     |       |       |      |
| 34                                | 2   | 77  | 8600  | 5332 | 0    | 2838  | 258  | 0    | 86   | 240  | 38.4 | 3.69 | 104 | 12.6 | 10.00  |     |       |       |      |
| 36                                | 1   | 40  | 8300  | 2594 | 0    | 3213  | 630  | 63   | 0    | 220  | 37.1 | 3.96 | 94  | 12.5 | 9.60   |     |       |       |      |
| 37                                | 1   | 53  | 5500  | 1960 | 0    | 3080  | 55   | 330  | 55   | 203  | 42.2 | 4.35 | 97  | 14.1 | 2.10   |     |       |       |      |
| 39                                | 2   | 47  | 7100  | 4473 | 0    | 2343  | 71   | 0    | 213  | 335  | 38.7 | 4.09 | 95  | 13.5 | 2.20   |     |       |       |      |
| 40                                | 1   | 62  | 8100  | 3807 | 0    | 3888  | 324  | 81   | 0    | 280  | 39.6 | 4.15 | 95  | 13.7 | 3.10   |     |       |       |      |
| 41                                | 1   | 74  | 6700  | 4355 | 0    | 1875  | 536  | 134  | 0    | 205  | 40.5 | 4.27 | 95  | 13.1 | 3.40   |     |       |       |      |
| 42                                | 2   | 36  | 11000 | 7150 | 220  | 3410  | 110  | 0    | 110  | 165  | 35.8 | 3.33 | 108 | 12.6 | 3.70   |     |       |       |      |
| 44                                | 1   | 37  | 8400  | 2856 | 0    | 4116  | 252  | 1008 | 168  | 245  | 42.1 | 4.93 | 85  | 14.4 | 5.10   |     | 8.7   |       |      |
| 47                                | 1   | 41  | 8300  | 3403 | 0    | 4067  | 498  | 166  | 166  | 230  | 44.4 | 4.32 | 103 | 15.5 | .50    |     |       |       |      |
| 49                                | 2   | 49  |       |      |      |       |      |      |      |      |      |      |     |      | 1.80   |     |       |       |      |
| 61                                | 2   | 41  | 7600  | 4484 | 0    | 2888  | 0    | 608  | 0    | 295  | 45.3 | 5.06 | 90  | 16.5 | .30    |     |       | 349.0 |      |
| 63                                | 2   | 68  | 6500  | 3640 | 0    | 2275  | 195  | 195  | 0    | 280  | 38.2 | 4.13 | 92  | 13.8 |        |     | 103.0 |       | 3.   |
| 64                                | 2   | 63  |       |      |      |       |      |      |      |      |      |      |     |      | 80.00  |     |       |       |      |
| 65                                | 2   | 34  | 7100  | 4616 | 0    | 1704  | 639  | 0    | 142  | 270  | 36.0 | 3.87 | 93  | 11.9 | 10.80  |     |       |       |      |
| 66                                | 2   | 62  | 7100  | 3083 | 71   | 3337  | 284  | 284  | 71   | 245  | 38.0 | 4.14 | 92  | 13.0 | 3.00   |     |       |       |      |
| 67                                | 2   | 46  | 6600  | 3696 | 0    | 2178  | 462  | 198  | 66   | 260  | 38.8 | 4.11 | 94  | 13.6 | .60    |     | 9.2   |       |      |
| 71                                | 2   | 59  | 7400  | 4514 | 74   | 2368  | 74   | 370  | 0    | 230  | 38.4 | 4.08 | 94  | 13.0 | 2.80   |     |       |       |      |
| 72                                | 2   | 40  | 5700  | 3591 | 57   | 1824  | 225  | 0    | 0    | 275  | 39.0 | 4.46 | 87  | 13.1 | 131.00 |     |       |       |      |
| 73                                | 1   | 51  | 6600  | 3894 | 0    | 2244  | 264  | 198  | 0    | 205  | 45.0 | 4.81 | 94  | 15.2 | .10    |     |       |       |      |
| 74                                | 2   | 49  | 10900 | 5668 | 0    | 4033  | 545  | 545  | 109  | 375  | 43.9 | 4.92 | 89  | 15.2 |        |     |       |       |      |
| 75                                | 2   | 44  | 10400 | 5408 | 0    | 3640  | 416  | 936  | 0    | 295  | 40.6 | 4.38 | 93  | 13.8 | 10.80  |     |       |       |      |
| 76                                | 1   | 43  | 8300  | 2324 | 0    | 5478  | 249  | 166  | 83   | 320  | 45.0 | 4.75 | 95  | 15.0 | 2.80   |     |       |       |      |
| 77                                | 1   | 57  |       |      |      |       |      |      |      |      |      |      |     |      | 1.90   |     |       |       |      |
| 78                                | 2   | 68  | 8500  | 4080 | 0    | 3400  | 680  | 340  | 0    | 235  | 40.6 | 4.25 | 96  | 12.5 | .10    |     |       |       |      |
| 79                                | 1   | 72  |       |      |      |       |      |      |      |      |      |      |     |      | 1.60   |     |       | 137.0 |      |
| 83                                | 1   | 32  | 6500  | 1560 | 0    | 4095  | 130  | 715  | 0    | 175  | 48.1 | 4.77 | 101 | 16.8 | 4.70   |     |       |       |      |
| 86                                | 2   | 32  | 6500  | 4160 | 0    | 1495  | 325  | 390  | 130  | 240  | 37.8 | 4.58 | 83  | 12.2 | 2.40   |     |       |       |      |
| 8                                 | 1   | 34  | 6700  | 2793 | 0    | 2223  | 570  | 57   | 57   | 295  | 41.7 | 4.44 | 94  | 14.6 | 2.60   |     |       |       |      |
| 8                                 | 2   | 34  | 11300 | 7910 | 0    | 2938  | 113  | 339  | 0    | 205  | 42.3 | 4.31 | 98  | 14.6 |        |     |       |       |      |
| 45                                | 2   | 65  | 7400  | 4810 | 74   | 1924  | 222  | 518  | 74   | 199  | 36.2 | 3.76 | 96  | 12.7 |        |     |       |       |      |
| 48                                | 2   | 38  | 5300  | 2809 | 53   | 2173  | 106  | 63   | 106  | 280  | 37.7 | 3.83 | 98  | 13.3 | 1.80   |     |       |       |      |
| 53                                | 2   | 40  |       |      |      |       |      |      |      |      |      |      |     |      | .80    |     |       |       |      |
| 70                                | 2   | 49  | 4800  | 2400 | 0    | 1920  | 48   | 432  | 0    | 175  | 37.1 | 4.44 | 84  | 12.8 |        |     |       |       |      |

| COMPUTER LISTING OF 1987 RAW DATA |     |     |       |       |      |       |      |      |      |     |      |      |     |      |      |      |      |       |   |
|-----------------------------------|-----|-----|-------|-------|------|-------|------|------|------|-----|------|------|-----|------|------|------|------|-------|---|
| PID                               | SEX | AGE | WBC   | PMN   | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH  | PRL  | T4   | FBS   | H |
| 81                                | 2   | 41  | 8100  | 3646  | 0    | 3159  | 182  | 1063 | 81   | 215 | 40.0 | 4.34 | 92  | 13.4 | .80  |      |      |       |   |
| 2102                              | 1   | 43  | 8100  | 3888  | 0    | 2916  | 891  | 243  | 182  | 308 | 44.9 | 4.86 | 98  | 15.6 | 1.40 |      |      | 87.0  |   |
| 2103                              | 1   | 76  | 16800 | 12600 | 672  | 2620  | 504  | 336  | 168  | 275 | 38.6 | 3.95 | 98  | 13.2 | 1.20 |      |      | 86.0  |   |
| 2104                              | 2   | 56  | 5900  | 3422  | 0    | 1829  | 531  | 118  | 0    | 215 | 39.2 | 4.11 | 95  | 13.0 | 5.00 |      | 5.4  | 121.0 |   |
| 2105                              | 1   | 78  | 10800 | 6804  | 0    | 2700  | 766  | 540  | 0    | 405 | 42.8 | 4.73 | 90  | 14.2 | .30  |      |      |       |   |
| 2107                              | 2   | 58  | 16200 | 8262  | 0    | 6966  | 486  | 324  | 162  | 420 | 41.2 | 4.83 | 89  | 13.4 | 2.20 |      |      | 154.0 |   |
| 2108                              | 1   | 43  | 6900  | 4209  | 207  | 2208  | 138  | 138  | 0    | 375 | 43.1 | 4.83 | 89  | 16.3 | 2.10 |      |      | 95.0  |   |
| 2110                              | 1   | 80  | 7300  | 3723  | 0    | 2701  | 366  | 366  | 73   | 335 | 35.1 | 3.37 | 104 | 12.3 | 3.10 |      |      |       |   |
| 2111                              | 2   | 36  | 21700 | 16275 | 0    | 3038  | 1302 | 1085 | 217  | 155 | 47.0 | 5.63 | 83  | 15.5 | 3.00 |      |      |       |   |
| 2113                              | 2   | 37  | 8900  | 4183  | 0    | 4272  | 267  | 178  | 0    | 340 | 44.5 | 5.41 | 82  | 14.9 | 1.90 |      |      | 274.0 |   |
| 2114                              | 1   | 73  | 8200  | 5822  | 82   | 1640  | 246  | 164  | 246  | 220 | 41.6 | 4.71 | 88  | 14.4 | 1.60 |      |      | 280.0 |   |
| 2117                              | 2   | 57  | 11200 | 5152  | 0    | 5040  | 336  | 448  | 0    | 295 | 43.7 | 4.69 | 93  | 14.7 | 3.40 |      |      | 221.0 |   |
| 2119                              | 2   | 51  | 8600  | 4816  | 0    | 3354  | 172  |      | 0    | 195 | 43.0 | 4.71 | 91  | 13.7 | 1.50 |      |      |       |   |
| 2126                              | 2   | 41  | 7800  | 6162  | 0    | 1560  | 0    | 0    | 78   | 340 | 38.4 | 4.22 | 91  | 12.5 | .70  |      |      |       |   |
| 2129                              | 2   | 50  | 7400  | 4884  | 74   | 1554  | 370  | 370  | 148  | 285 | 33.2 | 4.12 | 81  | 12.0 | 2.90 |      |      | 363.0 |   |
| 2130                              | 2   | 35  | 6100  | 3660  | 0    | 1952  | 122  | 366  | 0    | 240 | 35.0 | 3.87 | 90  | 12.0 | 1.00 | 12.1 |      |       |   |
| 2134                              | 2   | 33  |       |       |      |       |      |      |      |     |      |      |     |      | 1.40 |      |      |       |   |
| 2136                              | 1   | 37  | 7100  | 2911  | 0    | 3550  | 355  | 284  | 0    | 220 | 45.8 | 4.74 | 97  | 15.1 | 1.50 |      |      |       |   |
| 2137                              | 1   | 48  | 6500  | 3445  | 0    | 2600  | 195  | 195  | 65   | 290 | 40.4 | 4.38 | 93  | 13.6 | 1.50 |      |      |       |   |
| 2138                              | 2   | 38  | 7500  | 5400  | 0    | 1575  | 300  | 150  | 0    | 300 | 32.4 | 3.47 | 93  | 11.2 | 1.30 |      |      |       |   |
| 2139                              | 2   | 68  | 6000  | 3680  | 0    | 1680  | 300  | 360  | 0    | 425 | 36.2 | 3.85 | 94  | 12.4 | 4.00 |      |      |       |   |
| 2140                              | 2   | 79  | 5700  | 3705  | 0    | 1539  | 285  | 171  | 0    | 260 | 28.0 | 3.18 | 91  | 9.9  | 5.40 |      |      |       |   |
| 2142                              | 1   | 38  | 8200  | 4428  | 0    | 2542  | 984  | 164  | 0    | 230 | 42.3 | 4.47 | 95  | 14.8 | 1.90 |      |      |       |   |
| 2143                              | 1   | 35  | 14700 | 6232  | 0    | 6174  | 0    | 147  | 147  | 335 | 44.4 | 5.09 | 81  | 15.0 | 3.40 |      |      | 92.0  |   |
| 2145                              | 1   | 65  | 5200  | 2860  | 0    | 1768  | 260  | 208  | 104  | 275 | 36.7 | 3.73 | 98  | 12.5 | 2.00 |      |      |       |   |
| 2148                              | 1   | 77  | 8500  | 3055  | 0    | 2730  | 390  | 195  | 130  | 225 | 37.0 | 3.94 | 94  | 12.6 | 4.30 |      |      |       |   |
| 2149                              | 2   | 41  | 7600  | 3800  | 0    | 3116  | 76   | 456  | 152  | 280 | 35.8 | 4.03 | 89  | 12.3 |      |      |      |       |   |
| 2150                              | 1   | 45  | 8400  | 5208  | 0    | 2436  | 588  | 168  | 0    | 320 | 47.9 | 5.61 | 85  | 16.5 | 1.70 |      |      | 256.0 |   |
| 2152                              | 1   | 50  | 6100  | 4331  | 0    | 1464  | 244  | 61   | 0    | 220 | 41.8 | 4.38 | 94  | 14.6 | 1.30 |      |      | 79.0  |   |
| 2153                              | 1   | 34  | 5500  | 2585  | 0    | 2200  | 440  | 165  | 110  | 205 | 41.2 | 5.05 | 82  | 14.0 | 2.80 |      |      |       |   |
| 2155                              | 1   | 33  | 5900  | 3068  | 0    | 2360  | 354  | 118  | 0    | 215 | 43.5 | 5.11 | 85  | 14.9 | 1.00 |      |      | 100.0 |   |
| 2156                              | 1   | 42  | 6100  | 2196  | 0    | 3599  | 244  | 0    | 61   | 270 | 50.3 | 5.24 | 96  | 17.4 | .90  |      |      | 89.0  |   |
| 2158                              | 2   | 62  | 6400  | 2752  | 0    | 2944  | 384  | 320  | 0    | 263 | 43.4 | 4.87 | 90  | 13.3 | 1.70 |      |      |       |   |
| 2159                              | 2   | 38  | 7400  | 4292  | 222  | 2220  | 592  | 74   | 0    | 490 | 42.7 | 4.86 | 88  | 14.9 | 1.90 |      |      |       |   |
| 2160                              | 2   | 37  | 6500  | 3445  | 0    | 2340  | 650  | 65   | 0    | 305 | 42.3 | 4.72 | 90  | 14.4 | 6.50 |      |      | 233.0 |   |
| 2162                              | 2   | 65  | 11100 | 7659  | 0    | 2331  | 888  | 111  | 111  | 290 | 35.5 | 4.13 | 86  | 12.3 | 4.30 |      |      |       |   |
| 2166                              | 1   | 70  | 10800 | 5508  | 216  | 4752  | 216  | 324  | 0    | 225 | 46.2 | 5.00 | 92  | 15.4 | 3.50 |      |      |       |   |
| 2167                              | 1   | 47  | 10300 | 5253  | 0    | 4120  | 824  | 103  | 0    | 215 | 44.8 | 5.08 | 88  | 15.5 | 1.10 |      |      |       |   |
| 2170                              | 1   | 74  |       |       |      |       |      |      |      |     |      |      |     |      |      |      |      |       |   |
| 2171                              | 2   | 35  | 8300  | 5312  | 0    | 2573  | 332  | 0    | 83   | 235 | 40.2 | 4.48 | 90  | 13.4 |      |      | 10.3 |       |   |
| 2172                              | 2   | 45  | 6400  | 3136  | 0    | 2624  | 448  | 128  | 64   | 440 | 40.6 | 4.57 | 89  | 13.6 | .40  |      |      | 206.0 |   |
| 2174                              | 1   | 33  | 9000  | 5490  | 0    | 2430  | 720  | 180  | 180  | 280 | 46.5 | 5.16 | 90  | 16.0 | 1.80 |      | 6.4  |       |   |
| 2176                              | 1   | 43  | 7300  | 3869  | 0    | 2993  | 365  | 73   | 0    | 255 | 43.7 | 4.62 | 95  | 15.1 | 1.40 |      |      | 167.0 |   |
| 2182                              | 2   | 55  | 5500  | 3190  | 0    | 2255  | 0    | 0    | 55   | 280 | 34.3 | 3.66 | 94  | 12.1 | 2.90 | 19.9 |      |       |   |
| 2188                              | 1   | 36  | 10500 | 7875  | 0    | 1890  | 735  | 0    | 0    | 315 | 50.7 | 5.38 | 94  | 16.3 | 1.70 |      |      |       |   |
| 2193                              | 2   | 64  | 5700  | 3819  | 0    | 1539  | 0    | 228  | 114  | 325 | 30.9 | 3.36 | 92  | 10.8 | 3.70 |      |      | 87.0  |   |
| 2195                              | 2   | 57  | 5700  | 2907  | 0    | 2394  | 114  | 228  | 57   | 375 | 37.8 | 4.49 | 84  | 12.8 | 1.20 |      | 9.4  |       |   |
| 2196                              | 2   | 71  | 7100  | 4189  | 0    | 2769  | 71   | 71   | 0    | 310 | 36.4 | 4.20 | 87  | 12.7 | .30  |      |      | 124.0 |   |
| 2197                              | 2   | 34  | 6700  | 3484  | 0    | 2680  | 134  | 268  | 134  | 235 | 34.7 | 3.74 | 93  | 12.0 | 1.30 |      |      |       |   |
| 2205                              | 1   | 62  | 8000  | 4240  | 0    | 2960  | 560  | 240  | 0    | 355 | 45.0 | 5.32 | 85  | 14.7 | 1.00 |      |      | 207.0 |   |
| 2206                              | 1   | 65  | 6000  | 3060  | 0    | 2100  | 600  | 240  | 0    | 240 | 40.4 | 4.49 | 90  | 14.2 | .90  |      |      |       |   |
| 2207                              | 1   | 38  | 8000  | 3040  | 0    | 3760  | 400  | 720  | 80   | 220 | 44.7 | 5.33 | 84  | 15.0 | 1.80 |      |      | 151.0 |   |
| 2208                              | 2   | 70  | 10100 | 7777  | 0    | 1717  | 101  | 404  | 101  | 265 | 36.2 | 3.98 | 91  | 12.6 | 5.60 |      |      | 289.0 |   |
| 2209                              | 2   | 38  | 8400  | 4536  | 0    | 3444  | 84   | 336  | 0    | 375 | 37.1 | 4.18 | 89  | 13.1 | 1.50 |      |      |       |   |

| COMPUTER LISTING OF 1987 RAW DATA |     |     |       |       |      |       |      |      |      |     |      |      |     |      |       |     |       |       |       |
|-----------------------------------|-----|-----|-------|-------|------|-------|------|------|------|-----|------|------|-----|------|-------|-----|-------|-------|-------|
| PID                               | SEX | AGE | WBC   | PMN   | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH   | PRL | T4    | FBS   | HBA1C |
| 2210                              | 2   | 33  | 12100 | 9559  | 121  | 2178  | 242  | 0    | 0    | 295 | 39.8 | 4.41 | 90  | 13.4 | 1.30  |     |       |       |       |
| 2212                              | 2   | 67  | 25200 | 24948 | 0    | 0     | 0    | 252  | 0    | 205 |      | 1.76 |     |      | 28.50 |     |       | 81.0  |       |
| 2213                              | 2   | 34  | 8300  | 4648  | 0    | 3071  | 166  | 332  | 83   | 365 | 33.9 | 3.83 | 89  | 12.2 | .90   |     |       |       |       |
| 2216                              | 2   | 66  | 9800  | 4998  | 0    | 3136  | 392  | 1274 | 0    | 285 | 40.4 | 4.69 | 86  | 14.0 |       |     | 222.0 | 10.   |       |
| 2216                              | 2   | 67  | 9700  | 5044  | 0    | 3589  | 388  | 679  | 0    | 355 | 37.6 | 4.41 | 85  | 13.2 | 1.90  |     |       | 95.0  | 8.    |
| 2217                              | 2   | 64  | 7400  | 4514  | 0    | 2072  | 296  | 0    | 222  | 260 | 37.5 | 4.13 | 91  | 13.2 | 2.00  |     |       | 90.0  | 8.    |
| 2220                              | 2   | 58  | 6800  | 3630  | 0    | 2178  | 462  | 198  | 132  | 250 | 38.9 | 4.09 | 95  | 13.5 | 4.50  |     | 4.6   |       |       |
| 2221                              | 2   | 65  | 8600  | 5332  | 0    | 1462  | 1462 | 86   | 258  | 390 | 38.4 | 4.08 | 94  | 13.2 | 5.40  |     |       |       |       |
| 2224                              | 2   | 64  | 5800  | 3770  | 0    | 1856  | 58   | 116  | 0    | 375 | 30.5 | 3.29 | 93  | 10.7 | 2.30  |     |       |       |       |
| 2225                              | 2   | 39  | 8800  | 4928  | 0    | 3080  | 528  | 264  | 0    | 235 | 34.1 | 3.96 | 86  | 11.6 | 3.90  |     |       |       |       |
| 2226                              | 2   | 34  | 6900  | 3933  | 69   | 2653  | 276  | 0    | 69   | 224 | 37.6 | 4.64 | 81  | 12.5 | 2.80  |     |       |       |       |
| 2227                              | 2   | 37  | 7300  | 3431  | 0    | 3066  | 584  | 146  | 73   | 370 | 38.6 | 4.58 | 84  | 12.8 | 1.70  |     |       |       |       |
| 2228                              | 2   | 41  |       |       |      |       |      |      |      |     |      |      |     |      | 1.40  |     |       |       |       |
| 2229                              | 2   | 51  | 10500 | 5985  | 0    | 4200  | 0    | 315  | 0    | 295 | 40.0 | 4.47 | 89  | 13.6 |       |     |       |       |       |
| 2230                              | 2   | 45  | 9200  | 5980  | 0    | 2852  | 184  | 0    | 184  | 339 | 41.1 | 4.94 | 83  | 14.2 | 1.50  |     |       | 174.0 | 10.   |
| 2231                              | 2   | 34  | 6900  | 3864  | 0    | 2622  | 138  | 207  | 0    | 378 | 42.7 | 5.01 | 85  | 14.8 | 2.00  | 2.8 |       | 223.0 |       |
| 2232                              | 1   | 35  | 9700  | 5238  | 194  | 3492  | 776  | 0    | 0    | 250 | 51.8 | 5.40 | 96  | 17.3 | 2.10  |     |       |       |       |
| 2234                              | 1   | 45  | 8200  | 3690  | 164  | 3528  | 738  | 82   | 0    | 280 | 45.3 | 5.04 | 90  | 15.7 | 3.40  |     |       |       |       |
| 2235                              | 1   | 40  | 8400  | 4536  | 0    | 2604  | 1008 | 168  | 0    | 250 | 42.7 | 4.64 | 92  | 14.5 | .70   |     |       |       |       |
| 2236                              | 1   | 44  | 4900  | 1764  | 0    | 2646  | 392  | 0    | 98   | 295 | 42.9 | 4.97 | 86  | 14.5 | .70   |     |       |       |       |
| 2239                              | 2   | 36  | 8200  | 5656  | 0    | 1394  | 410  | 656  | 82   | 345 | 34.1 | 3.92 | 87  | 12.0 | 2.00  |     |       |       |       |
| 2242                              | 1   | 33  | 8000  | 4960  | 0    | 2480  | 320  | 240  | 0    | 285 | 47.3 | 5.03 | 94  | 15.8 | 1.60  |     |       |       |       |
| 2244                              | 2   | 77  | 4900  | 1911  | 0    | 2450  | 490  | 0    | 49   | 280 | 34.6 | 3.57 | 97  | 11.7 | 3.10  |     |       | 143.0 | 9.    |
| 2245                              | 1   | 33  | 13400 | 6566  | 0    | 5226  | 1206 | 268  | 134  | 259 | 44.6 | 4.60 | 97  | 15.7 | 4.10  |     |       |       |       |
| 2247                              | 2   | 41  | 9100  | 4550  | 0    | 3003  | 273  | 1183 | 91   | 270 | 37.4 | 3.94 | 95  | 12.4 | 1.20  |     |       |       |       |
| 2248                              | 2   | 48  | 8500  | 4645  | 0    | 2380  | 425  | 596  | 255  | 285 | 42.5 | 5.05 | 84  | 14.5 |       |     | 244.0 | 11.   |       |
| 2250                              | 1   | 43  | 8500  | 3485  | 0    | 3995  | 510  | 425  | 85   | 230 | 48.9 | 5.49 | 89  | 15.7 | 1.10  |     |       |       |       |
| 2251                              | 2   | 38  | 6600  | 4666  | 0    | 1518  | 330  | 66   | 66   | 405 | 32.9 | 4.41 | 75  | 10.8 | 5.30  |     |       |       |       |
| 2254                              | 2   | 37  | 6000  | 3180  | 0    | 2400  | 360  | 60   | 0    |     | 37.4 | 4.54 | 82  | 12.7 | 4.10  |     |       |       |       |
| 2255                              | 2   | 33  | 8500  | 3740  | 0    | 3825  | 510  | 170  | 170  | 185 | 43.5 | 4.84 | 90  | 14.3 | 1.40  |     |       |       |       |
| 2256                              | 2   | 38  | 7800  | 5382  | 0    | 2028  | 234  | 156  | 0    | 420 | 38.8 | 4.39 | 88  | 13.2 | 1.10  |     |       | 380.0 | 12.   |
| 2257                              | 1   | 40  | 7400  | 3774  | 0    | 2738  | 666  | 74   | 74   | 225 | 45.3 | 5.21 | 87  | 15.0 | .70   |     |       |       |       |
| 2260                              | 2   | 33  | 8100  | 3807  | 0    | 3726  | 324  | 162  | 81   | 360 | 40.0 | 4.55 | 88  | 14.7 | 1.10  |     | 9.2   |       |       |
| 2261                              | 1   | 58  | 5800  | 3422  | 0    | 1508  | 522  | 348  | 0    | 190 | 50.6 | 5.49 | 92  | 16.0 | 2.90  |     |       |       |       |
| 2268                              | 1   | 32  | 7100  | 3905  | 0    | 2201  | 852  | 142  | 0    | 175 | 48.6 | 5.63 | 86  | 17.0 | 1.70  |     |       | 106.0 |       |
| 2269                              | 1   | 32  | 7800  | 4446  | 0    | 2652  | 468  | 156  | 78   | 265 | 46.0 | 4.78 | 96  | 16.0 | 2.00  |     | 6.9   | 172.0 | 10.   |
| 2271                              | 1   | 32  | 8100  | 4293  | 0    | 2997  | 466  | 243  | 81   | 360 | 46.5 | 5.16 | 90  | 15.8 | 2.00  |     |       |       |       |
| 2273                              | 1   | 33  | 9700  | 5238  | 0    | 2619  | 1455 | 291  | 97   | 325 | 51.6 | 6.04 | 85  | 17.7 | 1.50  |     |       |       |       |
| 2274                              | 1   | 32  | 7000  | 2240  | 0    | 4130  | 420  | 70   | 70   | 225 | 45.5 | 5.35 | 85  | 15.3 | 1.30  |     |       |       |       |
| 2276                              | 1   | 33  | 10200 | 5916  | 0    | 3570  | 510  | 102  | 102  | 200 | 47.0 | 5.51 | 91  | 16.7 | 1.90  |     |       | 179.0 | 8.    |
| 2277                              | 2   | 33  |       |       |      |       |      |      |      |     |      |      |     |      | 1.70  |     |       |       |       |
| 806                               | 2   | 33  | 5100  | 2040  | 0    | 2550  | 204  | 306  | 0    | 335 | 35.0 | 4.34 | 81  | 12.1 |       |     |       |       |       |
| 811                               | 2   | 33  | 9000  | 3240  | 0    | 5400  | 90   | 180  | 90   | 276 | 38.5 | 3.89 | 99  | 14.2 | 1.80  |     |       |       |       |
| 815                               | 1   | 37  | 5700  | 2850  | 0    | 2337  | 342  | 171  | 0    | 205 | 46.3 | 5.06 | 92  | 15.6 |       |     |       |       |       |
| 816                               | 2   | 37  | 6900  | 3864  | 0    | 2416  | 552  | 0    | 69   | 230 | 40.8 | 4.57 | 89  | 13.6 |       |     |       |       |       |
| 818                               | 1   | 36  | 7300  | 3285  | 0    | 3577  | 146  | 292  | 0    | 370 | 39.8 | 4.35 | 91  | 13.6 |       |     |       |       |       |
| 822                               | 1   | 41  | 6100  | 3233  | 0    | 2257  | 122  | 427  | 61   | 180 | 42.5 | 4.74 | 90  | 14.5 |       |     |       |       |       |
| 823                               | 1   | 43  | 7300  | 4599  | 0    | 1971  | 219  | 438  | 73   | 220 | 42.6 | 4.34 | 98  | 13.8 |       |     |       |       |       |
| 825                               | 2   | 45  | 8900  | 5963  | 0    | 2403  | 534  | 0    | 0    | 300 | 41.8 | 5.07 | 82  | 12.9 |       |     |       |       |       |
| 826                               | 2   | 50  | 5000  | 2750  | 0    | 1400  | 200  | 650  | 0    | 240 | 35.9 | 4.05 | 89  | 11.9 |       |     |       |       |       |
| 829                               | 2   | 49  | 4600  | 1932  | 0    | 2300  | 138  | 230  | 0    | 360 | 36.8 | 3.97 | 93  | 12.4 | .20   |     |       |       |       |
| 830                               | 1   | 48  | 6400  | 4416  | 0    | 1600  | 128  | 256  | 0    | 308 | 39.6 | 4.12 | 98  | 14.1 |       |     | 95.0  | 12.   |       |
| 831                               | 1   | 46  | 6600  | 2904  | 0    | 2904  | 330  | 462  | 0    | 340 | 46.0 | 4.84 | 95  | 15.3 |       |     |       |       |       |
| 832                               | 2   | 49  | 8800  | 5896  | 0    | 2200  | 264  | 440  | 0    | 260 | 39.2 | 4.68 | 84  | 13.0 |       |     |       |       |       |

| COMPUTER LISTING OF 1987 RAW DATA |     |     |       |      |      |       |      |      |      |     |      |      |     |      |      |     |      |       |       |
|-----------------------------------|-----|-----|-------|------|------|-------|------|------|------|-----|------|------|-----|------|------|-----|------|-------|-------|
| PID                               | SEX | AGE | WBC   | PMN  | BAND | LYMPH | MONO | EOS  | BASO | PLT | HCT  | RBC  | MCV | HGB  | TSH  | PRL | T4   | FBS   | HBA1C |
| 833                               | 1   | 54  | 5000  | 1750 | 0    | 2950  | 50   | 100  | 0    | 200 | 44.2 | 5.23 | 85  | 14.6 |      |     |      |       |       |
| 834                               | 1   | 53  | 5700  | 3685 | 0    | 2548  | 335  | 134  | 0    | 355 | 45.0 | 4.99 | 90  | 15.0 |      |     |      |       |       |
| 835                               | 2   | 53  | 6200  | 2418 | 0    | 3348  | 248  | 62   | 124  | 220 | 43.1 | 4.49 | 96  | 15.0 |      |     |      | 218.0 | 6.7   |
| 838                               | 1   | 54  | 7100  | 3834 | 0    | 2982  | 71   | 213  | 0    | 233 | 46.8 | 4.76 | 97  | 16.0 |      |     |      | 89.0  |       |
| 839                               | 2   | 59  | 9900  | 2673 | 99   | 6336  | 693  | 99   | 0    | 210 | 42.2 | 4.52 | 93  | 15.1 |      |     |      | 114.0 |       |
| 841                               | 2   | 54  | 10900 | 7957 | 0    | 1962  | 872  | 327  | 0    | 237 | 36.1 | 4.06 | 89  | 12.8 | 1.80 |     |      | 109.0 |       |
| 843                               | 2   | 58  | 7200  | 3024 | 144  | 2808  | 360  | 864  | 0    | 235 | 36.2 | 3.93 | 92  | 13.0 |      |     |      |       |       |
| 844                               | 2   | 58  | 5400  | 2638 | 0    | 2538  | 162  | 162  | 0    | 210 | 41.2 | 4.41 | 93  | 12.8 |      |     |      |       |       |
| 845                               | 1   | 57  | 7400  | 4218 | 0    | 2220  | 740  | 222  | 0    | 195 | 47.0 | 5.08 | 93  | 14.3 |      |     |      |       |       |
| 851                               | 2   | 77  | 6200  | 3906 | 0    | 1922  | 186  | 310  | 62   | 200 | 33.3 | 3.38 | 99  | 11.9 |      |     |      | 159.0 | 8.3   |
| 857                               | 2   | 58  | 6800  | 2652 | 0    | 4012  | 0    | 136  | 0    | 200 | 42.5 | 4.89 | 91  | 14.1 |      |     |      | 187.0 | 10.4  |
| 861                               | 1   | 54  | 7700  | 4620 | 0    | 2156  | 616  | 154  | 154  | 160 | 44.4 | 4.84 | 92  | 13.9 |      |     |      | 118.0 | 7.1   |
| 862                               | 1   | 54  | 6200  | 3658 | 0    | 1984  | 434  | 124  | 0    | 185 | 42.6 | 5.04 | 85  | 14.8 |      |     |      | 108.0 | 7.1   |
| 863                               | 1   | 75  | 6800  | 2584 | 0    | 3672  | 408  | 136  | 0    | 200 | 42.8 | 4.24 | 101 | 14.3 | 3.40 |     |      |       |       |
| 868                               | 2   | 57  | 7500  | 3975 | 0    | 3225  | 225  | 0    | 75   | 245 | 39.7 | 4.36 | 91  | 13.8 |      |     |      |       |       |
| 891                               | 2   | 38  | 7400  | 4218 | 0    | 2960  | 74   | 148  | 0    | 405 | 35.4 | 3.90 | 90  | 12.1 |      |     |      |       |       |
| 896                               | 2   | 47  | 7100  | 3124 | 0    | 2698  | 710  | 568  | 0    | 430 | 37.2 | 4.26 | 87  | 12.5 |      |     |      |       |       |
| 909                               | 2   | 37  | 8100  | 3240 | 0    | 3888  | 405  | 486  | 81   | 300 | 40.5 | 4.29 | 94  | 13.4 |      |     |      |       |       |
| 911                               | 2   | 34  | 5800  | 2610 | 0    | 2610  | 232  | 174  | 174  | 280 | 43.0 | 4.78 | 90  | 13.3 |      |     |      |       |       |
| 912                               | 1   | 34  | 7600  | 3344 | 0    | 3268  | 456  | 456  | 78   | 260 | 40.2 | 4.62 | 87  | 14.0 |      |     |      |       |       |
| 914                               | 2   | 52  | 9500  | 6080 | 0    | 2375  | 0    | 1045 | 0    | 295 | 36.7 | 4.16 | 88  | 12.7 |      |     |      |       |       |
| 917                               | 1   | 66  | 11500 | 7015 | 0    | 3680  | 575  | 115  | 115  | 270 | 32.7 | 4.01 | 82  | 11.7 |      |     |      | 152.0 | 8.0   |
| 920                               | 1   | 55  | 8800  | 4752 | 88   | 3608  | 264  | 88   | 0    | 169 | 41.4 | 4.41 | 94  | 14.6 |      |     |      | 139.0 |       |
| 922                               | 2   | 62  | 12100 | 4719 | 121  | 6171  | 242  | 847  | 0    | 390 | 36.5 | 3.94 | 93  | 13.2 |      |     |      |       |       |
| 925                               | 2   | 36  | 6900  | 4628 | 0    | 3293  | 89   | 801  | 89   | 400 | 39.3 | 4.75 | 83  | 13.1 |      |     |      |       |       |
| 928                               | 2   | 74  | 4700  | 1833 | 0    | 2256  | 0    | 611  | 0    | 215 | 29.7 | 2.99 | 99  | 10.2 |      |     |      |       |       |
| 931                               | 1   | 33  | 5100  | 2295 | 0    | 2142  | 459  | 153  | 51   | 295 | 45.7 | 4.62 | 99  | 15.3 |      |     |      |       |       |
| 932                               | 2   | 62  | 8000  | 3920 | 0    | 3120  | 320  | 480  | 160  | 305 | 34.1 | 3.52 | 97  | 11.8 |      |     |      |       |       |
| 934                               | 2   | 62  | 7500  | 2850 | 150  | 3375  | 450  | 375  | 300  | 395 | 43.1 | 5.01 | 86  | 14.5 |      |     |      |       |       |
| 938                               | 2   | 54  | 7800  | 4368 | 0    | 2808  | 390  | 234  | 0    | 175 | 38.2 | 4.51 | 85  | 13.0 | 3.70 |     |      |       |       |
| 939                               | 1   | 41  | 8900  | 6408 | 0    | 1958  | 356  | 356  | 178  | 280 | 46.9 | 5.01 | 93  | 15.0 |      |     |      |       |       |
| 941                               | 2   | 56  | 6900  | 4278 | 0    | 2415  | 69   | 0    | 138  | 335 | 38.5 | 4.14 | 93  | 12.6 |      |     |      |       |       |
| 942                               | 2   | 72  | 4800  | 2256 | 0    | 1968  | 288  | 288  | 0    | 295 | 35.0 | 3.76 | 93  | 12.3 |      |     | 10.9 | 91.0  | 6.2   |
| 944                               | 1   | 62  | 8100  | 3402 | 0    | 3402  | 810  | 486  | 0    | 225 | 43.6 | 5.17 | 84  | 15.4 |      |     |      |       |       |
| 955                               | 2   | 35  | 6300  | 3087 | 0    | 2772  | 63   | 378  | 63   | 220 | 38.0 | 3.98 | 95  | 12.8 |      |     |      |       |       |
| 958                               | 1   | 55  | 10500 | 5670 | 210  | 3255  | 315  | 945  | 0    | 325 | 36.8 | 4.04 | 91  | 12.4 |      |     |      |       |       |
| 960                               | 2   | 35  | 11900 | 7378 | 0    | 3689  | 595  | 119  | 119  | 260 | 34.3 | 3.81 | 90  | 11.8 |      |     |      |       |       |
| 963                               | 1   | 59  | 9100  | 5278 | 0    | 3185  | 91   | 548  | 0    | 240 | 43.1 | 4.71 | 92  | 14.6 |      |     |      |       |       |
| 965                               | 2   | 43  | 8900  | 5340 | 0    | 2681  | 267  | 712  | 0    | 345 | 36.9 | 4.14 | 89  | 12.5 | 2.40 |     |      |       | 9.6   |
| 966                               | 1   | 55  | 7900  | 5451 | 79   | 1501  | 316  | 474  | 79   | 500 | 36.7 | 3.76 | 98  | 12.4 |      |     |      |       |       |
| 969                               | 1   | 69  | 8800  | 5896 | 0    | 2288  | 264  | 352  | 0    | 315 | 39.5 | 4.11 | 96  | 13.8 |      |     |      |       |       |
| 970                               | 2   | 73  | 7400  | 4144 | 0    | 3034  | 0    | 74   | 148  | 180 | 25.6 | 2.60 | 98  | 8.8  |      |     |      |       |       |
| 971                               | 1   | 44  | 7700  | 3927 | 0    | 3003  | 154  | 308  | 154  | 345 | 43.4 | 4.97 | 87  | 14.2 |      |     |      |       |       |
| 980                               | 2   | 34  | 5700  | 2337 | 0    | 2907  | 171  | 228  | 57   | 245 | 41.8 | 4.64 | 90  | 13.9 | .90  |     |      |       |       |
| 981                               | 1   | 33  |       |      |      |       |      |      |      |     |      |      |     |      |      |     |      |       |       |
| 993                               | 2   | 40  | 6200  | 1738 | 0    | 4030  | 310  | 62   | 62   | 315 | 40.7 | 4.64 | 88  | 14.2 |      |     |      |       |       |
| 998                               | 2   | 39  | 6700  | 4020 | 0    | 2345  | 201  | 134  | 0    | 235 | 41.0 | 4.62 | 89  | 14.3 |      |     |      | 218.0 | 9.2   |
| 1001                              | 2   | 53  | 7800  | 5226 | 0    | 2262  | 234  | 78   | 0    | 205 | 44.3 | 5.39 | 82  | 15.1 |      |     |      |       |       |
| 1007                              | 1   | 76  | 6000  | 3960 | 0    | 1740  | 180  | 120  | 0    | 260 | 36.6 | 4.06 | 90  | 12.6 |      |     | 13.6 | 124.0 | 7.5   |
| 1036                              | 1   | 35  | 5700  | 1767 | 0    | 3363  | 513  | 57   | 0    | 320 | 48.7 | 5.68 | 86  | 16.8 |      |     |      |       |       |
| 1500                              | 1   | 56  | 10000 | 5200 | 0    | 3700  | 900  | 100  | 100  | 370 | 41.7 | 4.67 | 89  | 13.1 |      |     |      | 120.0 | 11.6  |
| 1519                              | 1   | 44  | 8900  | 6230 | 0    | 2492  | 178  | 0    | 0    | 325 | 45.8 | 4.90 | 93  | 15.7 |      |     |      |       | 7.1   |
| 1520                              | 2   | 56  | 8300  | 5229 | 0    | 2739  | 83   | 83   | 83   | 175 | 41.9 | 4.94 | 85  | 14.3 |      |     |      | 287.0 | 10.3  |
| 1524                              | 1   | 44  | 10300 | 5871 | 0    | 4017  | 206  | 206  | 0    | 225 | 44.1 | 4.65 | 95  | 15.1 |      |     |      |       |       |

| PID  | SEX | AGE | WBC   | PMN  | BAND | LYMPH | COMPUTER LISTING OF 1987 RAW DATA |      |      |     |     |      |      |     |      |      | TSH | PRL | T4    | FBS |
|------|-----|-----|-------|------|------|-------|-----------------------------------|------|------|-----|-----|------|------|-----|------|------|-----|-----|-------|-----|
|      |     |     |       |      |      |       | MONO                              | EOS  | BASO | PLT | HCT | RBC  | MCV  | HGB |      |      |     |     |       |     |
| 1526 | 1   | 56  | 13100 | 6943 |      | 0     | 4061                              | 524  | 1310 | 262 | 266 | 41.9 | 4.65 | 90  | 14.3 |      |     |     | 101.0 |     |
| 1533 | 1   | 34  |       |      |      |       |                                   |      |      |     |     |      |      |     |      |      |     |     |       |     |
| 1541 | 2   | 59  | 7900  | 4187 |      | 0     | 3081                              | 158  | 316  | 158 | 190 | 38.3 | 4.28 | 89  | 13.3 |      |     |     |       |     |
| 1546 | 1   | 73  | 6100  | 3660 |      | 61    | 2135                              | 183  | 61   | 0   | 130 | 44.6 | 4.71 | 95  | 15.0 |      |     |     | 207.0 |     |
| 1548 | 2   | 45  | 11200 | 6048 |      | 672   | 2688                              | 224  | 448  | 0   | 300 | 34.0 | 3.73 | 91  | 12.2 |      |     |     |       |     |
| 1552 | 1   | 57  | 6100  | 2989 |      | 0     | 2684                              | 122  | 183  | 122 | 220 | 41.0 | 4.66 | 90  | 14.0 |      |     |     |       |     |
| 1553 | 1   | 35  | 8000  | 3680 |      | 0     | 2880                              | 720  | 640  | 80  | 260 | 42.7 | 4.38 | 97  | 14.4 |      |     |     |       |     |
| 1555 | 2   | 44  | 8400  | 4788 |      | 84    | 2940                              | 252  | 168  | 168 | 250 | 43.9 | 5.56 | 79  | 14.9 |      |     |     |       |     |
| 1556 | 2   | 42  | 6700  | 1876 |      | 0     | 4221                              | 536  | 0    | 67  | 236 | 41.0 | 4.19 | 98  | 13.5 | 4.40 |     |     |       |     |
| 1557 | 1   | 39  | 8400  | 3948 |      | 0     | 3360                              | 252  | 640  | 0   | 225 | 36.7 | 3.99 | 92  | 13.2 |      |     |     | 95.0  |     |
| 1559 | 2   | 34  | 9800  | 4018 |      | 196   | 4704                              | 784  | 98   | 0   | 275 | 40.5 | 4.98 | 81  | 13.4 |      |     |     |       |     |
| 1560 | 2   | 63  | 7900  | 3713 |      | 0     | 3397                              | 553  | 79   | 0   | 185 | 43.9 | 4.55 | 96  | 14.7 |      |     |     |       |     |
| 1561 | 2   | 69  | 8000  | 4960 |      | 0     | 2320                              | 400  | 320  | 0   | 330 | 36.4 | 3.77 | 97  | 13.0 |      |     |     |       |     |
| 1564 | 2   | 38  | 10600 | 4028 |      | 0     | 5512                              | 530  | 318  | 212 | 330 | 39.7 | 4.46 | 89  | 12.9 |      |     |     |       |     |
| 1565 | 1   | 42  | 8400  | 3948 |      | 0     | 3612                              | 84   | 672  | 84  | 335 | 46.2 | 4.67 | 99  | 15.8 |      |     |     |       |     |
| 1567 | 2   | 33  | 5200  | 2756 |      | 0     | 2028                              | 104  | 208  | 104 | 265 | 35.3 | 4.04 | 87  | 11.8 |      |     |     |       |     |
| 1577 | 2   | 36  |       |      |      |       |                                   |      |      |     |     |      |      |     |      |      |     |     |       |     |
| 1578 | 2   | 51  | 7400  | 2738 |      | 0     | 3182                              | 1184 | 148  | 148 | 330 | 44.4 | 5.16 | 86  | 15.4 |      |     |     | 217.0 |     |